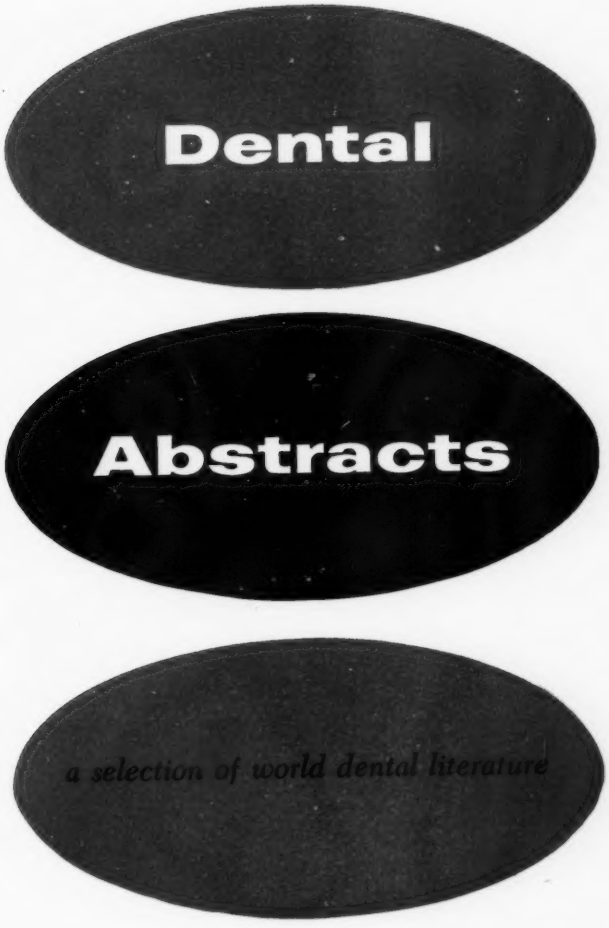

AMERICAN DENTAL ASSOCIATION

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Dental Abstracts

. . . . a selection of world dental literature

Lon W. Morrey, D.D.S., editor
N. C. Hudson, assistant editor

AMERICAN DENTAL ASSOCIATION

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3. To supply enough data in each abstract so that the reader may determine whether he wishes to refer to the original article for more complete information.

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Armamentarium

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Instruments

The sharpening of prophylactic instruments

Henry M. Swenson. *J.Am.D.Hygienists'A.* 31:6-7, 10 Jan. 1957

Sharpness is an absolute necessity for scaling instruments. A dull scaler will burnish the surface of the calculus, making it difficult and sometimes impossible to remove. To work with dull instruments is also time-consuming and tiring for the operator, and a source of unnecessary discomfort to the patient.

The instruments most favored for removing calculus may be grouped into four categories: sickles, hoes, curets and files.

A sickle scaler is simple to sharpen and requires no expensive equipment. A no. 5 diamond ruby stone is used. It is a cylindrical stone, $\frac{3}{16}$ inch in diameter, and is used in a straight handpiece. The stone should be moistened with water before it is used. It is placed on the concave surface of the instrument and set in motion as indicated in illustration, A. A slight lateral movement is applied to prevent grooving the stone. In about ten seconds the instrument is sharp.

The hoe type of instrument can be sharpened easily with any type of flat stone. The hoe scaler is placed on the stone in such a position that the entire beveled surface is flat against the stone. A few strokes, duplicating the same angle, will sharpen the instrument (illustration, B).

It is difficult to sharpen files. They should be returned to the manufacturer for this service.

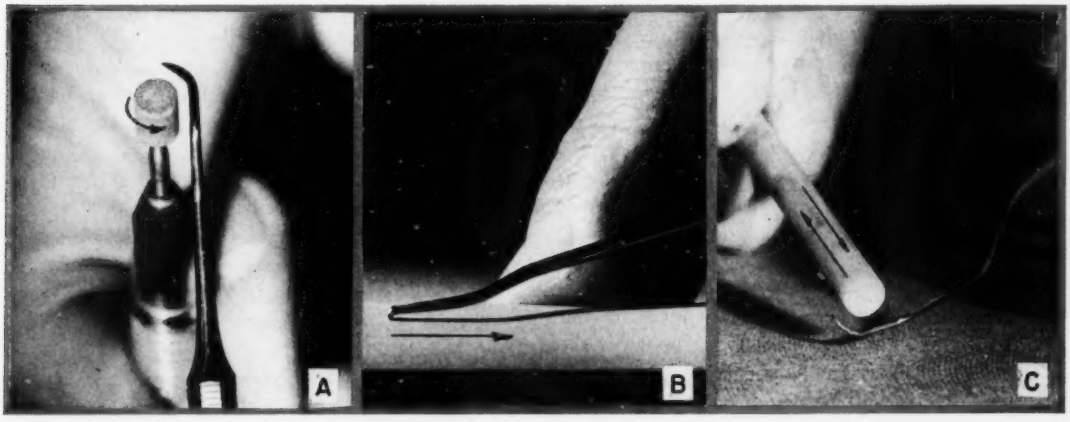
The curet can be sharpened by using a $\frac{3}{16}$ inch Arkansas oil stone as shown in illustration C. A few strokes in this manner will restore the edge to the instrument.

School of Dentistry, Indiana University, 1121 West Michigan Street, Indianapolis, Ind.

A Sharpening a sickel scaler on a cylindrical stone

B Sharpening a scaler on a flat stone

C Sharpening a curet with an Arkansas oil stone



Straight and right angle handpieces with ball bearings for dental practice
(Handstücke und Rechtwinkelinstrumente mit Kugelgelenk für die zahnärztliche Praxis)

Arthur Henninger. *Dent.Echo* 26:145-146 Nov. 1956

Among the many new instruments shown at the Thirteenth International Dental Exhibition held in Munich (August 20 to 26, 1956), straight and right angle handpieces with ball bearings were viewed with great interest by German and foreign dentists.

These instruments can be sterilized properly in steam under pressure, dry heat, boiling water or free-flowing steam. It is not necessary to take them apart before or during sterilization.

The ball-bearing handpieces are equipped with an efficient lubrication system which lasts for many years. The need for oiling is eliminated.

The instruments require a minimum of maintenance and are always ready for use.

The elimination of friction in moving parts, evident in most customary instruments, was the major problem of the designers. Ball bearings now are so widely used in various industries, transportation, agriculture, commerce and even in modern household appliances, that handpieces without them would indicate a backward movement in the manufacture of dental instruments.

To build handpieces with ball bearings required entirely new designs, not just a few minor modifications or improvements.

The first ball-bearing handpieces were placed for experimental use in offices of many German and foreign dentists as early as 1953. The applicability of these instruments was tested at dental clinics. It was established that most of these instruments still are in use.

Today, after more than three years, many dentists can testify to the fact that the ball-bearing straight and right angle handpieces are significant contributions to operative dentistry, and the importance of this development can be compared to the introduction of the first electric dental engine.

Dentistry is benefited constantly by the development of new materials, drugs, machines, instruments, methods and technics. In the last five years, the introduction of dental engines operating at high speed, frictionless handpieces and superior cutting instruments has enabled the practicing dentist to reduce his chairside time and to operate with less fatigue to himself and with more comfort to the patient.

Dentists who do not want to operate with ultrasonic speed will be especially interested in these ball-bearing instruments because it is possible to use them at any speed. These instruments permit not only saving of time and personnel but of expense.

Hansastrasse 21c, Karlsruhe, Germany

An electronically controlled unit combining engine and handpieces for dental practice
(Eine elektronische kontrollierte Kombination von Motor und Handstücken für die zahnärztliche Praxis)

H. Ostner. *Dent.Echo* 26:143 Nov. 1956

The electronically controlled unit, "Ultradent," which combines engine and handpieces was demonstrated successfully at the Thirteenth International Dental Exhibition in Munich, August 20 to 26, 1956.

The advantage which can be gained by changing from operating at standard speed, with a maximum of 4,500 rpm, to operating at a speed up to 20,000 rpm, is not recognized as yet by the dental profession.

Although the high-speed handpieces with appropriate diamond or carbide burs, when properly lubricated, decrease the time needed for an average cavity preparation, the basic principles involved in cavity preparation do not change.

The electronically controlled unit can be operated from low speed (10 rpm) to the highest speed possible (25,000 rpm).

This unit makes it possible to drill and excavate first at a low speed and later at a high speed. With the customary resistance-controlled engine, such a change in speed is not attainable.

The diamond and carbide instruments are kept clean during use, and no time is required to free them of debris.

The annoyance caused by the vibration that results from the moving parts of a conventional

rotating drill is practically absent. Patients report that they feel no pain, even when the dentin is cut, with a handpiece operating at a high speed.

Favorable clinical results were obtained with Ultradent in 40 patients ranging in age from 10 to 70 years.

Georgenstrasse 61, Munich 13, Germany

▼ Materials

Practical notes on dental materials: expanding artificial stones

F. W. Craddock and R. H. Roydhouse. *New Zealand D.J.* 53:22-24 Jan. 1957

"EP1," an expanding artificial stone widely used in New Zealand, has a strength of 2,700 pounds per square inch and a setting time of 12 minutes. Ordinary stone has a strength of 2,500 pounds and a setting time of 15 minutes, and plaster of paris a strength of 800 pounds and a setting time of five minutes. It is evident that expanding stone is of good strength and that its setting time is not inconveniently long. It mixes easily and smoothly, produces casts of fine texture, and suffers less than many ordinary stones from a powdery surface when poured into hydrocolloid impressions.

Since its nominal setting expansion of 0.38 per cent is insufficient to compensate fully for the nominal shrinkage of acrylic resin, it might be asked why its expanding property was not more fully developed. The answer is complex.

The molds used in processing dentures are closed or partly closed, which imposes restraint on deliberately contrived dimensional corrections. The restraining effect on dimensional change which is imposed by even the simplest form of mold becomes apparent when an attempt is made to measure the unrestrained linear expansion of, say, plaster of paris. A simple, V-shaped brass trough, even though highly polished and lubricated, imposes some restraint on setting expansion. Even a flexible and compressible alginate impression could yet be sufficiently rigid to hinder the setting expansion of the plaster or stone poured into it. The amount of expansion also varies with changes in the humidity of the surrounding atmosphere.

From these and other considerations it appears that an attempt to compensate fully for dimensional changes in objects of complex shape would carry the risk of exchanging one kind of distortion for another. Ideally, dental scientists should try to develop dimensionally accurate materials rather than materials which might compensate for dimensional inaccuracy. In the meantime, it is probably better to "err" (as expanding stones do) on the side of undercompensation.

The term "nominal" might be used in describing the processing shrinkage of acrylic resin as 2.00 per cent linear, or the setting expansion of artificial stone as 0.20 per cent linear. These percentages do not mean that an acrylic denture is one fiftieth "smaller" than it should be, or that a stone cast is one five-hundredth "larger" than it should be. It is rather that the resin denture has probably distorted ten times as seriously as the cast.

Four or five years' use shows that casts made of EP1 provide a satisfactory basis for the fabrication of chromium-cobalt dentures by a commercial laboratory. Clinically it has not been possible to detect any differences in the fit of metal partial dentures made on normal and expanding stone casts.

University of Otago Dental School, P.O. Box 647, Dunedin, New Zealand

Re-evaluation of self-hardening resins

Alan R. Docking. *Bul.Alabama D.A.* 41:18-19 Jan. 1957

In the past three years authorities in various countries have reported somewhat conflicting observations on self-curing acrylic fillings. The dental profession is still awaiting an acrylic resin with less curing shrinkage, greater elastic modulus and hardness, lower thermal expansion, and a bacteriostatic effect. The excellent esthetic properties of acrylic resin, its ease of manipulation and insertion and its insolubility in mouth fluids are sufficient incentives to persevere with

research toward adapting it more fully to direct filling work.

Although the volumetric shrinkage of from 6 to 8 per cent cannot be prevented, its effects can be minimized by the brush-on technic of Nealon or the laminating and reactor technic of Nordin.

No satisfactory methods of improving the low elastic modulus of acrylic resins have been suggested, although the incorporation of cross-linking resin may be of assistance.

The hope of lowering the thermal expansion of acrylic resin seems even more hopeless after the report of von Kreudenstein (1954) that the thermal expansion of acrylic resin is some 40 to 65 per cent greater if measured in a physiologic salt solution rather than dry. Some workers have shown that the thermal expansion can be reduced by the addition of various inorganic fillers. Usually thermal changes and the absorption of moisture play havoc with the seal initially obtained.

Experiments with the incorporation of antibacterial agents have been reported but their clinical effect is yet to be tried. The more soluble agents appear to minimize the effects of bacterial penetration of the margins, but, unfortunately, their higher solubility leads to a rapid loss of potency through leaching. The use of less soluble agents has little effect.

University of Melbourne, Melbourne, Australia

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Therapeutics

Placental stimulins in stomatology

(Las estimulinas placentarias in estomatología)

Enrique Garcia Martinez. *Rev.españ.estomat.* 4:507-515 Nov.-Dec. 1956

Filatov states that there are stimulins in the tissues, nonspecific in nature, the concentration of which increases when cell life becomes difficult. These stimulins, of unknown chemical composition, exist both in animal and plant tissues, and, though they are not specific in their action, they seem to be more active on similar or identical tissues. Thus, placental stimulins are more active on the vascular system, corneal stimulins on cornea, and stimulins from the jaws on teeth, and so forth.

Although the mechanism of the action of stimulins is not understood, their administration produces systemic improvement. The patient manifests more willingness to work, and sometimes gains in weight. It is thought that stimulins constitute an auxiliary medication that activates inert medicaments.

This histotherapy has few contraindications. When such reactions as urticaria, eczema, nausea, sweating or hypotension appear, the reactions are mild.

Stimulins have been used in stomatology since 1951 and have proved their usefulness in periodontitis but not in periodontosis.

All necessary periodontal instrumental treatment is followed by the administration of antibiotics if there is suppuration. Stimulins are given intramuscularly daily for 15 days, with oral administration of vitamin C.

Stimulins decrease and retard the progress of the disease and also produce systemic improvement; however, they must be given every fourth, fifth or sixth month. Periodontal disease, it must be remembered, is a chronic condition.

Stimulins have been given and have proved their usefulness in alveolitis, postextraction neuritis, pericoronitis, trismus due to myositis, and adenitis. Results have been exceptionally gratifying in necrotizing ulcerative gingivitis once the acute stage is over.

Guillen de Castro, 139, Valencia, Spain

Clinical experiences with "Romicil," a new antibiotic

(Klinische Erfahrungen mit "Romicil," einem neuen Antibiotikum)

W. Siegenthaler, G. Keiser and R. Hegglin. *Deut.med.Wschr.* 81:2074-2080 Dec. 21, 1956

The recently introduced antibiotic "Romicil" has as its active component oleandomycin which is obtained from *Streptomyces antibioticus.*

Clinical experiences proved that Romicil is highly effective against gram-positive microorganisms such as staphylococci, pneumococci and streptococci, and it is also efficient, although

to a lesser degree, against gram-negative microorganisms such as Hemophilus, Brucella, Neisseria and against certain types of Rickettsia, Leptospira and viruses.

At the Cantonal Hospital of St. Gallen, Switzerland, Romicil was given to 216 patients with a variety of infections in the oral cavity and staphylococcal infections of the skin.

Romicil was also effective in a number of other diseases such as Q fever, leptospirosis, virus pneumonia and cystitis caused by the gram-negative Enterobacteriaceae and Pseudomonas.

The effects of Romicil on coliform bacilli, however, are doubtful.

Besides mild diarrhea, occurring in a few instances, no other side effects were observed.

Romicil, as most other antibiotics, possesses certain toxic potentialities, and it is capable of producing resistant strains of microorganisms.

Medizinische Klinik, Kantonsspital, St. Gallen, Switzerland

▼

Miscellaneous

On sterilization by dry heat

(Om hetluftssterilisation)

G. Frostell and L. Holmlund.

Svensk tandlak.Tskr. 50:79-92 Feb. 1957

Sterilization by steam is more effective than sterilization by dry heat, but in practice dry heat has certain advantages over steam. In Sweden, therefore, dry heat sterilization is used by most private dentists.

The Royal Dental College in Stockholm asked the authors to investigate the efficiency in routine operation of its large dry heat sterilizers and also to determine the period of time required for sterilization with different types of ovens used by private dentists.

The bigger types of ovens used by the Dental College accommodate ten closed aluminum boxes, the smaller types used in private practice hold four boxes only. The location of the heating elements was similar in all types of sterilizers tested. All were equipped with thermostats and built-in thermometers.

The sterilization period can be divided into four parts: the elevation time, the equalizing time, the effective sterilization time, and the cooling time. The Royal Medical Board of Sweden prescribes for dry heat sterilizers a minimum sterilizing period of 30 minutes after the oven temperature has reached 180°C. In the experiments reported, the sterilizing time varied greatly but was never less than this minimum.

The test material consisted of earth spores in sealed envelopes placed inside the fully loaded aluminum boxes in such a way that they were never in direct contact with the bottom or lid. After the sterilization period, the contents of the envelopes were transferred to culture tubes containing broth and kept at 37°C. for ten days. Precautions were taken to prevent contamination of the material during transfer.

Sixty-four experiments were performed with the big ovens under conditions used for routine operation. Thirty-five of the experiments gave unsatisfactory results, as growth was obtained from one or more of the spore packets. In one type of sterilizer unsuccessful results were obtained on the upper or lower shelves only, whereas in the others no consistent pattern could be found.

With most types of the small sterilizers sterility was obtained after from 70 to 75 minutes of total heating time, whereas 60 to 65 minutes would give unsatisfactory results.

As normally the ovens would register 180°C. after 20 to 30 minutes, it follows that the effective sterilization time should be far more than the minimum time prescribed by the Royal Medical Board. If not all shelves are filled or if the boxes are not fully loaded, sterilization may be obtained in shorter time. It is important, however, that the time be made long enough to secure sterility under all conditions, including a safety margin for the possibility of inaccurate thermostats and partly defective heating elements.

Tandläkarhögskolan, Stockholm 3, Sweden

Professional activities

▼

Miscellaneous

The fine arts and dentistry (Part II)

(A propos des quelques aspects stomatologiques dans les beaux-arts)

Imre Székely. *Actual.odontostomat.*, Paris 10:411-429 Sept. 1956

Beauty, the absolute perfection of an ideal, or idea, cannot be attributed to nature but to art or to the artist's mind and imagination. The ideal of beauty, however, changes with each generation and it varies with races and individuals. Only the values of beauty, created by art, endure and their appreciation and understanding depend mainly on the artistic and esthetic training of the observer.

The function of art is almost as difficult to define as the meaning of art. It would be a fallacy to identify art with representation of nature. Art is not a representation but an interpretation of nature. True art begins when the artist departs from a strict imitation of nature, imposing on it the rhythms of his own creative imagination.

The criticism of the misinterpretations of facial and oral structures as portrayed in the work of many artists, therefore, is not a criticism of the artist's ability or of the value of the work.

This necessary artistic rhythm in interpretation is observable in H. van der Goes' painting of a moron whose facial features show tremendous fear of the unfriendly environment, the strange world.

The author's sculpture of a self-sufficient boy shows the features of a habitual thumbsucker with a protracted upper jaw and malocclusion, obviously requiring immediate orthodontic treatment. These works of art are of particular interest to the dentist, and so are many portraits and anatomic drawings by Leonardo da Vinci.

Albrecht Dürer's "Portrait of the Artist's Mother" demonstrates the features of an edentulous old woman.

Diego de Velazquez's "Philip IV of Spain" depicts the "Hapsburg lip," an enlarged protuding lower lip, a peculiarity observable in 18 generations of the Hapsburg.

How humor and irony can be emphasized by stressing or distorting facial or dental features are shown in the caricatures by George Grosz and the dental paintings by David Solot. Many reproductions of Solot's paintings have appeared in DENTAL ABSTRACTS [January and June, 1956, March, 1957].

Dental topics and symbols are shown in D. Vandervael's plaque which was cast for the First Belgian Dental Congress, and in the author's emblem which was designed for the Dental Clinic of the University of Budapest, Hungary.

Arnold Böcklin's "Mask in Sandstone" shows the distorted facial features of a patient suffering from severe toothache and inflammation. A sculpture by I. M. Barrerton (one of the artist's serial statues of various races) seems to depict a similar subject.

"The Dentist," a caricature by Cham (Amédée de Noé), shows a dental charlatan at the fair who tries to prove the quality of the inserted artificial dentures by letting his patient bite horseshoes to pieces.

The author's high relief work, "Oral Surgeon," depicts operative surgery not in its sober reality but as seen from the neurotic patient's viewpoint as the cause of his foreboding (anxiety neurosis).

Mária utca 52, Budapest 8, Hungary

1 *Plaque for the First Belgian Dental Congress, by D. Vandervael*
2 *Emblem for the dental clinic of the University of Budapest, by I. Székely*
3 *"Oral Surgeon" by I. Székely*
4 *"Dentist" by Cham (Amédée de Noé)*
5 *"Portrait of the Artist's Mother" by Albrecht Dürer*
6 *"Philip IV of Spain" by Diego de Velazquez*
7 *"Head of a Boy" by I. Székely*

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The 1956 survey of dental practice. VI. The dentist's work week and work year; certain office practices

J.A.D.A. 54:570-574 April 1957

This is the sixth article in a series prepared by the American Dental Association's Bureau of Economic Research and Statistics.

Only 2.9 per cent of all nonsalaried dentists responding to a questionnaire said they worked six full days per week in 1955. This figure varied from 2.1 per cent in the Southeast to 7.7 per cent in the Northwest.

The most common practice, reported by 34.3 per cent, was to take one whole day off. Nationally, Wednesday was the favorite day off (11.5 per cent), followed by Saturday (8.7 per cent) and Thursday (8.4 per cent). The choice of a whole day varied considerably according to region. In the Southeast, Thursday was the favorite day off, whereas in the Far West, Southwest and Northwest it was Saturday. In the Middle East, Friday was almost as popular as Wednesday as a day off.

Nearly 16 per cent of the respondents took two half days off, usually the afternoons of either Saturday and Wednesday or Saturday and Thursday.

Eighteen per cent of the respondents worked five and a half days per week. Almost all the dentists who worked five and a half days took an afternoon rather than a morning off.

One of every six dentists took one and a half days off per week. One of every 12 dentists closed his office two full days per week.

The average number of days worked per week was 4.9. The mean number of office hours per week was 43.2 in 1955, a figure almost identical to the 43.3 hours found in the survey covering 1952.

The typical dentist spent 35.3 hours per week at the chair, 4.1 hours in the laboratory and 3.8 hours in other office activities. It is estimated that the average dentist in the United States in 1955 worked 8.8 hours per day in the office.

The mean number of weeks worked in 1955 was 47.2. Multiplying the mean number of hours in the office per week by the mean number of weeks worked indicates that the average dentist spent 2,039 hours in the office during 1955, of which about 1,666 hours were at the chair.

Dividing income by number of hours worked during the year shows that the typical nonsalaried dentist averaged a gross income of $10.84 per hour in the office or $13.26 per hour at the chair. He averaged a net income of $6.12 per hour in the office or $7.49 per hour at the chair.

222 East Superior Street, Chicago 11, Ill.

The Don Clawson clinic

Al-Kulliyah. p. 5 Feb. 1957

The Don Clawson Dental Clinic at the Gulbenkian Infirmary on the campus of the American University of Beirut, Lebanon, was dedicated December 17, 1956, on the fifth anniversary of Dr. Clawson's death. The clinic was presented jointly by the American University and by K. Tabourian. At the brief ceremony a message from the secretary general of the International College of Dentistry was read by its regent, P. Hadidian, after which Cisti Zurayk unveiled the plaque of dedication. Among those attending the ceremony was Jamil Kena'an, president of the Dental Association in Lebanon.

Dr. Clawson taught at the American University's Dental School between 1930 and 1934. He left the school to work as the dentist in a mobile dental clinic which he had designed for desert work. Subsequently he introduced dental treatment and oral hygiene in the most backward regions of Syria and Iraq. He became director of the Dental School, Meharry Medical College, Nashville, Tenn., and later president of that college, and then head of the dental clinic at Oak Ridge, Tenn.

In 1949 Dr. Clawson had written to Dr. K. Tabourian: "The dream of my life is to return to a modern, up-to-date American dental school in Beirut, and, after seeing it put in satisfactory operation, retire to the beautiful mountains of Lebanon and write a few books." The Don Clawson Dental Clinic will serve to perpetuate his memory on the campus of the American University of Beirut.

American University of Beirut, Beirut, Lebanon.

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Forensic dentistry

Personal identification by means of the teeth

Robert D. Wyckoff. *U.S.Armed Forces M.J.* 8:500-506 April 1957

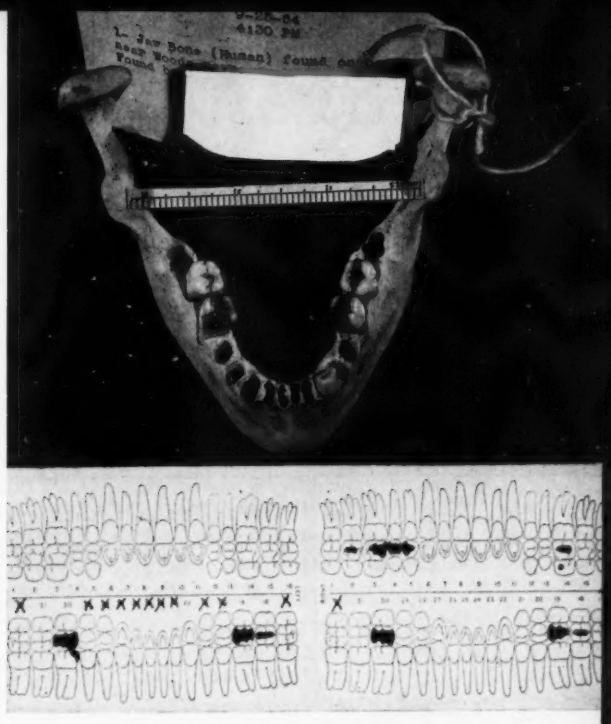

Figure 1 A mandible was found on a California beach in 1954. Police investigation revealed that it could have been that of a man who had drowned in that area a year before. His body had never been found. He had served in the Navy in World War II. A positive identification was made by comparing the mandible with the Navy dental record (below right). The chart (below left) was made from the mandible. The empty root sockets in the mandible indicated that all teeth had been present at the time of death

The determination of personal identity is the recognition of an individual by characteristics which distinguish that one person from all others. Fingerprints are considered the best means of identification because they have characteristics in great variety, have individuality, do not change throughout life, and can be recorded accurately.

If complete and currently accurate dental records are available, the teeth provide an excellent, and in some instances the only, means of identification. Two factors make it possible to use the teeth for this purpose:

1. The crowns of the teeth, their supporting bony structures, and the restorative materials used by the dental profession are almost indestructible.

2. There is little chance—the possible combinations with 32 teeth number over four billion—of there ever being two persons with identical sets of teeth.

The value of the teeth for determining the personal identity of casualties caused by fire, drowning and battle has been proved many times in the armed services. On entry into the Navy or Marine Corps, each person receives a dental examination, and all missing teeth, existing restorations, dental caries and abnormalities are recorded in duplicate on standard form 603, the dental record. The original record accompanies the individual throughout his career, and each dental treatment is entered on his record as it occurs. The duplicate record is sent to the Bureau of Medicine and Surgery in Washington, D.C., where it remains until the member is separated from the service, at which time the original and duplicate records are sent to the Naval Records Management Center in St. Louis, Mo., for permanent filing. Over nine million such records are now on file. When the personal identity of Navy or Marine Corps personnel must be determined by means of the teeth, requests for assistance are directed to the Dental Division of the Bureau of Medicine and Surgery.

When the dental record of a known person is compared with that of an unknown person, it is not mandatory that the two records match perfectly in order to establish positive identification. It is mandatory, however, that there be unquestionable points of similarity between the two records with no existing impossibilities, such as

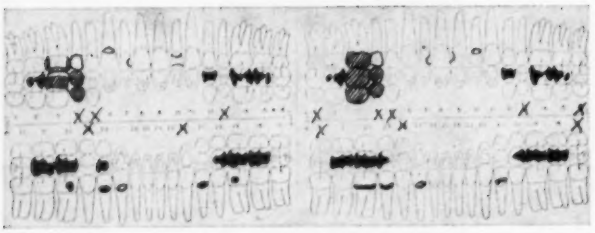

Figure 2 Chart at left was made in 1950 from dentition of a skeleton found in the Mojave Desert. Five years later a billfold found in the area indicated that the skeleton might have been that of a Marine officer who had been missing since 1947. The dental record at the right, made in 1946 when the officer had been discharged, was obtained from Naval Records Management Center. Positive identification was made by comparing records

restorations on the dental record of the known which do not exist on the record made from the teeth of the unknown casualty. Points of similarity may be defined as artificial or natural dental characteristics that appear to have been recorded from the same individual.

Characteristics that rarely occur have greater value in establishing identity than those which occur frequently. The final determination as to whether the dental record of the known is also that of the unknown rests on the judgment of the investigator who has evaluated the dental evidence at hand. Experience has shown that when the record of the known is compared with that made from the unknown there is seldom any doubt. In almost all instances the record either matches or does not match.

The importance of identification of the dead cannot be overemphasized. Establishment of personal identity is not only a passive sort of comfort to the next of kin but often is a requirement in the settlement of legal entanglements.

Although there is no organized body of dental experts in this field, it is within the capability of all dentists to assist in the identification of the dead when teeth are involved. This is a service to the other forensic sciences that may be rendered by the dental profession.

Bureau of Medicine and Surgery, Department of the Navy, Washington, D.C.

▼

Licensure

Stomatology or dentistry

(Estomatologiá ou odontologiá)

F. Cruz. *J.estomat.,Lisbon* 3:14-15 June-July 1956

In Portugal neither dental nor stomatologic schools exist, but there are dentists and stomatologists. Until 1930, dentists were more or less mechanical constructors of prostheses who later began freely to practice dentistry.

In 1937, laws aimed at organizing the practice of dentistry were passed, and a special "syndicate" created to control the fulfillment of these laws. The syndicate requires that all applicants for admission to the practice of dentistry must join the syndicate and pass an examination on routine knowledge of dentistry. Violations, however, still continue. Recently the syndicate has licensed also persons who possess pseudodiplomas from any dental school regardless of the status of the school. Inadequately trained persons, therefore, have obtained a license to practice dentistry.

Many competent dentists who had graduated from dental colleges in the United States, Switzerland and other countries also practice dentistry in the larger cities.

Stomatology is strictly within the domain of medicine. In Portugal, only candidates having an M.D. degree are allowed to practice stomatology. The candidate for a stomatologic degree must have a thorough knowledge and training in theory and practice. Frequently, however, their technical skill is rather inadequate because no courses

on stomatology are given nor do schools of stomatology exist in Portugal.

More than a year ago, a petition was presented to the government requesting the establishment of courses on stomatology at the faculties of medicine of the three Portuguese universities and also the creation of an independent school of stomatology.

A new law had been passed but was not put into effect because of the conflicting ideas of some members of the government as to whether an M.D. degree should be required of applicants who want to practice dentistry or stomatology.

The responsibility of both the dentist and the stomatologist to diagnose cancer of the mouth, systemic diseases that cause oral manifestations and dental focal infection which may cause heart disease, rheumatic conditions and other diseases makes it necessary that an M.D. degree be required of applicants who wish to practice either specialty.

Dentistry and stomatology, therefore, would be practiced by physicians only who possess a thorough training.

It is hoped that the government will act soon and that these resolutions will be put in action.

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▼ Education

What the dental student should be taught in nutrition

Philip Jay. *J.D.Educ.* 20:301-303 Nov. 1956

The practicing dentist should be sufficiently familiar with the science of nutrition to be able to distinguish those areas in which information has been disseminated which is not well-founded and which has provided opportunists with a field for exploitation. The dentist must have sound, scientific judgment in respect to diet therapy in order to resist the tempting claims proffered by pseudo nutritionists.

It is only in the field of dental caries control that diet therapy is based on sound evidence. In this field the only anticaries nutrient thus far demonstrated is the fluoride ion which is incorporated into the tooth during the tooth development period. Other than that, the treatment of dental caries is strictly a dietary problem in which sugar and sometimes other carbohydrates must be restricted without disturbing the nutritional adequacy of the diet.

There are no data which indicate that the results of periodontal and orthodontic treatment are influenced by any specific diet therapy. The data which have been presented as evidence that gingival, periodontal and alveolar disturbances respond to dietary treatment are unconvincing and, in many instances, improperly obtained. Although there is an abundance of evidence to indicate that milk is a valuable, economical source of important nutrients, and that during early childhood it may specifically affect tooth development, there is no evidence that the consumption of milk will either arrest or prevent dental caries.

In whatever manner the teaching of nutrition is accomplished, the subject material must cover the following: a general consideration of protein, fat and carbohydrate metabolism; the significance of the essential amino acids; the fat soluble vitamins A and D; the water soluble vitamins—thiamine hydrochloride, riboflavin and nicotinic acid; ascorbic acid; general consideration of essential elements: calcium, phosphorus, iron, iodine and fluorine, and the control of dental caries, including detailed instruction in the planning of diets, a general consideration of the significance of carbohydrates in the etiology and control of dental caries, and the use of oral lactobacillus counts as a guide to the degree to which carbohydrates need be restricted.

The teaching program should be designed to emphasize the dangers of placing any reliance whatever on most material available in newsstand magazines and "best seller" types of publications.

Instruction in nutrition is important mostly to combat faddism. The kind of information published each year in the Council on Dental Therapeutics' *Accepted Dental Remedies* serves as a reliable guide to the application of observations on nutrition in dentistry.

School of Dentistry, University of Michigan, Ann Arbor, Mich.

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Organization

The Armed Forces Commission of the International Dental Federation: its work during the last five years and its future

P. Budin. *Internat.D.J.* 6:556-567 Dec. 1956

The work of the Armed Forces Commission of the Fédération Dentaire Internationale since 1950 is summarized. A questionnaire with 48 questions, concerning the status of the dental officer in the armed forces, was sent to authorities in about 50 countries. Fourteen replies were received. In 1953 Major Van der Woerd (Holland) reported on the answers obtained.

Reports from four countries have been received on the relation between civil and military authorities in the organization of dental care.

The commission has investigated the possibility of standardization of dental equipment in the armed forces. A request to SHAPE (Supreme Headquarters Allied Powers Europe) that it create a post of dentist within its General Medical Staff was denied.

The commission has recommended to the F.D.I. that the International Red Cross be asked to have included in the Code of International Law a section dealing with dentists and dentistry as distinct from medical personnel and medicine. It was further proposed that such a requested section should specify the rights of dentists and dental personnel when under prisoner of war status to treat their own military personnel and to have access to suitable equipment and supplies.

At the International Quinquennial Dental Congress at London in 1952, an exhibition of dental equipment in the armed forces was presented and four lectures on military dentistry were given.

The commission was successful in having the International Committee for Medicine and Pharmacy in the Armed Forces recognize a dental section, with a dental delegate to the Permanent Committee.

It is proposed that the commission set up three subcommissions to study the following: (1) administration and the status of the army dental corps; (2) therapeutic and scientific problems pertaining to the army, hygiene and propaganda, and (3) the role and training of the dentist in the maxillofacial team.

School of Dental Surgery and Stomatology, Paris, France

The Benevolent Fund

Editorial. *Brit.D.J.* 102:139 Feb. 19, 1957

The Benevolent Fund of the British Dental Association is not organized or directed by the Association. The Fund was founded one year after the Association, to provide help for members and their widows or orphans when in need. The work of the Fund is conducted by a committee of management consisting of a chairman, honorary secretary and honorary treasurer, together with members from all branches of the Association.

Practitioners who undergo serious illness in early life and lack of funds in old age, and the wives and children of dentists who with tragic suddenness find themselves widows and orphans, are the special care of the Fund.

About 17 per cent of the membership of the Association subscribe direct to the fund. Less than 40 per cent of the Fund's income comes from regular subscribers. Money for the Fund is also raised by the sale of waste amalgam, Christmas seals, and badges for automobiles.

Although the welfare state may assist some persons in need, the Fund still has to accept a large number of persons as its special responsibility. Today the number of beneficiaries is more than 100, and further applications are being received constantly.

There is no dentist who could not afford to send each year to the Fund the fee for one amalgam filling or one prophylaxis. Although legacies or large gifts of money would be of great assistance to the Fund, what would redound more to the credit of the profession would be for the great majority each to give a small sum annually. That is what the Fund's committee seeks.

Operative dentistry

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Inlays and fillings

Thermogenetic effect of ultrasonic cavity preparation

Leo Zach, Arthur H. Morrison and Gerson Cohen. *New York D.J.* 23:123-127 March 1957

New mechanical technics for removing tooth substance have stimulated research designed to provide a biologic assay of tooth and tissue tolerances to the new modalities. A set of studies was outlined with the ultrasonic dental cutting machine to determine the extent of heat generation when the device is employed clinically.

A freshly dissected mandible and maxilla, stripped to periosteum, from a recently sacrificed 12 pound dog, were used. Two thermocouples were placed in each tooth, one as close to the apex of the tooth involved as possible and the second almost within the pulp chamber.

Seventy-nine cavities were prepared in the dog's jaws and ten in the maxillary central and lateral incisors of a 57 year old man volunteer prior to extraction of the teeth for prosthetic reasons. Cutting with the ultrasonic unit was continued for 60 seconds. The teeth were bathed in slurry.

Thermogenesis with ultrasonic cavity preparation seems correlated with the size of the tooth cut in a directly linear manner. Heat rise within the tooth (measured intrapulpally) seems to be a direct heat wave transmission spreading through the substance of the tooth centripetally from the point of force application. Thermal change around the tooth, within the supporting structures, may be mediated through phase barriers by oscillation of the vibrating tooth in its elastic and fluid containing periodontal membrane.

Heat rise measured within the pulp, as a result of intracoronal cavity preparation, was observed sooner and reached a greater intensity than any change measured simultaneously or analogously at the root apex. Heavy cutting pressure, in excess of effective tooth reduction requirements, caused a rapid spurt in heat generation but was not efficient in removing tooth substance. Whereas pronounced differences were recorded in apical and pulpal temperatures under all cutting directions, no statistical significance was found in the thermal generation as a result of cutting a tooth with force applied parallel or perpendicular to its long axis.

In vivo experiments are being continued in permanent and deciduous teeth, to be followed by histologic evaluation in an attempt to correlate observed temperature changes with possible pulpal and periodontal alterations.

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The effect of cavity preparation on the human dental pulp

Edward A. Marsland and David S. Shovelton. *Brit.D.J.* 102:213-224 March 19, 1957

The immediate effects produced in the dental pulp by the preparation of cavities with tungsten-carbide burs at speeds ranging from 1,000 to 15,000 rpm were studied, together with the effects seen up to 28 days after cavity preparation. Cavities were prepared in caries-free permanent teeth which were scheduled to be extracted for orthodontic or other purposes. A number of contralateral teeth, in which no cavities were prepared, were used as controls. The teeth were extracted, and serial sections were prepared.

The results indicate that the damage to the pulp during cavity preparation may be considerable. The severity of the injury bears some relationship to the depth of the cavity, the type of bur, the speed at which the bur is used, and the length of time the bur is applied to tooth substance. The evidence strongly suggests that the damage to the pulp is, to a large extent, caused by the heat generated during the preparation of the cavity. This conclusion is supported by the following observations: (1) injury to the pulp is not always limited to that part directly beneath the dentinal tubules opened during cavity preparation; (2) fast and continuous cutting of the enamel can damage the pulp, and (3) adequate

cooling substantially reduces the pulp damage.

Peyton and Henry (1954) reported that temperature rises of the order of 59° C. may be produced readily in a tooth during cavity preparation. The present study indicates that even considerable thicknesses of dentin do not prevent temperature rises of this order in the pulp. It seems likely that the effect of the heat on the pulp is to disturb the normal flow of tissue fluid around the odontoblasts and give rise to blisters or vacuoles similar to those seen in first degree burns of the skin.

As far as the immediate effects on the pulp of cavity preparation are concerned, the most consistent finding is aspiration of the odontoblast nuclei into the dentinal tubules.

The following general clinical implications can be drawn from this preliminary investigation:

1. The human dental pulp may be able to recover from a considerable degree of damage.

2. Pulps showing considerable differences in degree of damage gave rise to no clinical symptoms. Lack of pain is not a certain indication that a pulp is healthy.

3. There is some evidence to suggest that during normal cavity preparation tungsten-carbide burs may be less damaging to the pulp than steel burs. Steel burs blunt rapidly in use and produce excessive heat, whereas tungsten-carbide burs retain their cutting efficiency for long periods. There may be danger, however, in the use of tungsten-carbide burs at the much faster cutting speeds now available.

4. The extent of the damage to the pulp during cavity preparation does not seem to have been emphasized sufficiently in the past. It is probable that degrees of damage to the pulp comparable with those found in this investigation may be caused daily in the course of normal cavity preparation.

5. The use of efficient cooling devices noticeably reduces the thermal damage of cavity preparation. It is suggested that the use of coolants is essential to ensure safe cavity preparation at speeds over 4,000 rpm.

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Cavity preparation by ultrasonic versus rotary instrumentation: in vitro cutting effectiveness and heat production

Jack L. Hartley. *U.S.Armed Forces M.J.* 8:519-527 April 1957

A comparatively recent development in the field of operative dentistry instrumentation utilizes ultrasonic vibration, along with an abrasive slurry of aluminum oxide, to remove enamel and dentin. This study was designed to compare the *in vitro* cutting effectiveness of rotating instruments at 400 rpm, at 12,000 rpm, and an ultrasonic instrument with a frequency of 29,000 cycles per second. Simultaneous temperature measurements on the pulp chamber were accomplished by means of thermocouples throughout the experiment.

Fifty cavities were prepared by each of the three methods in sound human teeth which had been extracted for prosthetic purposes or because of periodontal involvement.

Temperatures produced within the pulp chambers of anterior teeth, bicuspids and molars ranged from a minimum average temperature rise of 1.9° C. in molars after ultrasonic preparation to a maximum average rise of 10.0° C. in anterior teeth prepared by a high-speed rotary instrument.

The possibility of heat damage to the pulp during ultrasonic instrumentation properly employed appears to be no greater than with conventional rotary instrumentation.

The average time required to prepare anterior Class V cavities with low-speed instrumentation was 2.3 minutes. Class V cavities in bicuspids and molars required an average of 2.4 minutes at 400 rpm. Class I cavities in bicuspids and molars required an average of 2.5 minutes.

High-speed instrumentation required an average of 1.7 minutes to cut Class V cavities in the anterior teeth. An average of 2.0 minutes was required to prepare Class V cavities in bicuspids and molars at 12,000 rpm. An average of 2.5 minutes was required to prepare Class I cavities in bicuspids and molars at the high speed.

Ultrasonic cutting with the abrasive slurry resulted in an average of 2.4 minutes for Class V preparations in anterior teeth and 2.0 minutes for

Class V preparations in bicuspids and molars. Class I cavity preparations required an average of 2.2 minutes in bicuspids and molars by the ultrasonic technic.

Air University School of Aviation Medicine, U.S. Air Force, Randolph Air Force Base, Texas

A practical restoration for combating cervical erosion

Hayward G. Flickner and Bert D. Horn, Jr. *J.Indiana D.A.* 36:15-16 April 1957

The problem of treating erosion in the cervical third of a tooth is difficult. The authors recommend a quick, simple method of placing a restoration to stop the erosion and to conserve tooth substance.

Generally, the eroded regions are free from caries or stains. Since the erosion has more or less outlined the cavity preparation, the cavity walls have only to be reshaped. These cavities frequently penetrate into the dentin and often have well-established cervical margins; when the cervical margin is not well defined, however, it should be established with a large, tapered fissure bur. The cervical margin is beveled with a diamond stone or steel bur.

Retention is achieved by making three post holes. Two small post holes are made with a no. 700 bur, one toward the mesial margin and one toward the distal margin of the cavity outline. A large, shallow cervical post hole is made with a no. 701 or no. 702 bur. The cervical hole is about 1 mm. deep, depending on the amount of erosion. The two proximal post holes are located as far from the midline of the tooth as practicable. All post holes must be parallel so that a successful wax pattern can be made.

Blue inlay casting wax is warmed and placed in the cavity. A hot waxing instrument or broken explorer is used to ascertain that the wax has extended to the depth of the post holes. After the wax is cooled, only excessive wax is carved from the pattern, leaving a fair amount of bulk for attaching a sprue which is done in the mouth. This also helps to insure a more successful casting. The inlay is cast by a routine technic.

The facial surface of the gold inlay is ground down in the middle so that it is concave. This is done with stones and finished with Burlew disks. Thus, the finished restoration will appear eroded.

This concave design has been used with success in a number of instances. The erosion does not attack the inlay, and further recurrence has not been noted on the tooth, as so often happens with conventional Class V fillings.

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Further studies on the effects of silver nitrate on human dentin and pulp

Harold R. Englander and Verda E. James. *Internat.A.D.Res.Preprinted Abst.* 93 March 21, 1957

Ammoniacal silver nitrate was applied to the carious dentin of five nonexposed and ten carious exposed teeth, and reduced with eugenol for five minutes. These 15 human teeth were sealed with zinc oxide-eugenol cement and were extracted 9 to 32 days afterwards. Silver nitrate was applied to the carious dentin of ten nonexposed teeth for five and ten minutes and reduced with eugenol. These teeth were extracted within an hour after the application.

Histologic examination revealed that silver nitrate had completely penetrated the carious dentin of all five nonexposed teeth extracted 9 to 32 days after application; particles of silver were found within the pulps of all five teeth. Silver particles were observed within degenerating odontoblasts and other pulpal cells and were deposited around capillaries. Silver nitrate also had completely penetrated the vital dentin of all carious exposed teeth. In two of the ten teeth extracted within one hour after application, the silver nitrate had completely penetrated the dentin; in the eight remaining teeth, only superficial penetration had occurred. No difference in depth of penetration was noted between the five-minute and the ten-minute applications of silver nitrate. The reactions of dentin to ammoniacal and plain silver nitrate were similar.

This study confirms a previous report, and demonstrates that silver nitrate eventually penetrates the entire thickness of dentin and enters the pulp.

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Prosthetic dentistry

▼

Esthetics

Realistic, type-specific arrangement of artificial anterior teeth

(Beitrag zur realistischen, typenspezifischen Frontzahnaufstellung)

Karl Hörauf. *Quintessenz* 7:804 Sept. 1956

The laws of harmony govern the normal arrangement of teeth in each individual. The same laws, therefore, should direct the dentist's selection and arrangement of artificial teeth to meet the requirements of distinctness and complexity in unity which are characteristic of the patient.

These basic laws of harmony, stated briefly, are as follows:

1. Lines that are parallel—or appear to be parallel to the viewer—are harmonious.

2. Lines that converge or diverge, therefore, must be combined with additional lines which have to be shorter and fewer set in opposite directions to the primary lines to achieve the desired unity of effect.

3. Curved lines, running in a similar direction appear almost harmonious, but branching or diverging curved lines have to be added to complete harmony.

The alignment of the six anterior teeth in each jaw has a decided influence on the harmony between face form and tooth form.

The standardized ideal arrangement, previously used in dental prosthetics, appears to be replaced recently by a differentiated alignment of the anterior teeth in which the arrangement may appear to be inharmonious on the model but harmonious after insertion.

Harmony in dentistry means an orderly combination of different factors resulting in an esthetically pleasing general effect.

In designing and constructing harmonious dentures, the correlation between different factors must be considered and evaluated. These factors are the patient's body type, age, sex, face and jaw formation, and size, shape and position of the teeth.

The present-day dentist must be an artist. To many persons, however, art is a vague and mysterious thing. The perception and production of art work seem to depend solely on the spark of genius in the artist's soul. This common belief, or rather this assumption, misses the main point: all people have some artistic ability which needs only development.

In his comparatively narrow field of prosthetic art, the dentist should try to maintain the dual aim of making his dental restoration appear true to nature and true to esthetics.

The principles of tooth selection and arrangement for facial harmony are simple. The most practical method for achieving this is to become familiar with these principles and to study not only the patient's face but his body type.

Kretzschmer divides the human body types into three main categories:

1. The leptosome type with small face and nose, small shoulders, poorly developed muscles of the arms and legs, pigeon chest and sinking abdomen. The asthenic type represents the extreme degree of the leptosome type.

2. The athletic type with strong development of the skelton, musculature and teeth; wide shoulders, huge chest and muscular abdomen, and comparatively large hands and feet. In women of this type, the fat accumulation remains in a healthy correlation to skeleton and musculature.

3. The pyknic type with a large abdomen, squatness and general roundness of form; hands and feet are short and broad and extremely soft.

The illustrations show the variations in arrangement of anterior teeth in regard to the different body types.

Following the suggested procedure will result in the construction of better balanced dentures. The final effect, however, will depend on the artistic ability of the dentist.

Messkirch, Kreis Stockach, Germany

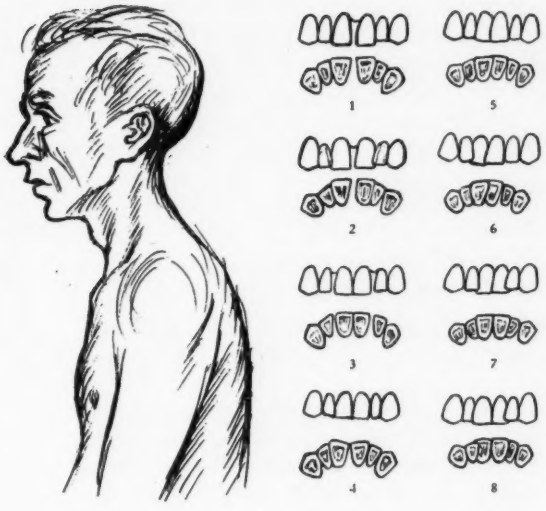

Figure 1 The leptosome type. Type-specific arrangement of anterior teeth for the leptosome type. 1 = interproximal space between the central incisors; 2 = labial twisting of the lateral incisors; 3 = interproximal space between central and lateral incisors; 4 = labial twisting of the distal edges of the central incisors; 5 = protruding central incisor; 6 = protruding of a central and lateral incisor; 7 = protruding lateral incisors, and 8 = malposed lateral incisors

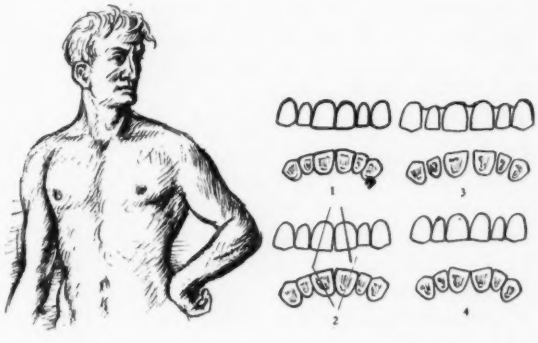

Figure 2 The athletic type. Type-specific arrangement of anterior teeth for the athletic type. 1 = prominent central incisors; 2 = different axial position of central incisors; 3 = widened interproximal space between all anterior teeth; 4 = labial twisting of the distal edges of central incisors

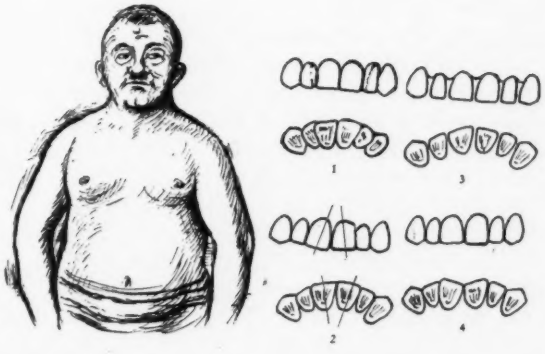

Figure 3 The pyknic type. Type-specific arrangement of anterior teeth for the pyknic type. 1 = labial twisting of the mesial edges of central incisors; 2 = different axial position of central incisors; 3 = widened interproximal spaces between all anterior teeth (typical for the pyknic type); 4 = labial twisting of the distal edges of central incisors, the lateral incisors are slightly retracted

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Partial dentures

The additive partial denture: its principles and design

M. M. De Van. *North-West Den.* 35:303-307,312 Nov. 1956

A partial denture is so designed that other units can be added without depriving the patient of the use of the denture for longer than a few hours. Such a denture has built into its initial design metallic parts which facilitate additions without seriously jeopardizing the stability or retention of the appliance. Patients can be induced to purchase gold alloy partial dentures if they can be assured that a reasonable number of other teeth may be added, should the necessity arise. The cost, when viewed in years of service, will be moderate if partial dentures are so designed.

This type of partial denture design promotes durability because of one of its cardinal principles: the use of all available tooth and tissue bearings in the mouth. The denture is so well stabilized that periodontal and mucoperiodontal torque is kept well within physiologic bounds. Abutments generally remain firm and serviceable. The denture, because it is so adequately stabilized, minimizes impingement on the membranes and thus minimizes pain.

The design of this partial denture is based on the following principles: (1) utilization of all available tooth and tissue bearings in the mouth (providing that such utilization does not interfere permanently with speech and appearance); (2) maximum use of contact bearings on the proximal and occlusal surfaces of the remaining teeth; contact bearings on the buccal, lingual and labial surfaces are employed sparingly; (3) use of the infrabulge proximal retainers wherever esthetics will allow; (4) use of rigid broad ribbon-like connectors instead of bars, and (5) modification of the occlusal pattern with the neutrocentric concept in mind.

Many partial dentures are designed according to the wishes of the patient who wants lightness and smallness, although his needs may be just the opposite. When the dentist is adamant concerning the need for adequate support in a partial denture, however, the patient generally will agree.

The most convincing argument for the use of proximal and occlusal bearings is the fact that these surfaces are so used with the natural dentition.

The design of this partial denture will often be accepted by the patient who, through necessity or an unwise sense of thrift, desires to become completely edentulous.

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Changes in periodontal tissues and supporting structures connected with partial dentures

Kalervo K. Koivumaa. *Suomen hammasläät.toim.* 52, Suppl.1:1-188, 1956

A clinical, histological and roentgenological investigation was made of patients wearing removable, partial dentures in an effort to determine changes the wearing of such dentures made in (1) the depth of the gingival pockets and the exposure of the cementoenamel junction in the remaining teeth; (2) the mobility of the teeth; (3) the condition of the gingival margin and other mucous membranes covered by the dentures, and (4) the alveolar process. Also investigated were possible changes in the articulation of the prostheses, and the patient's subjective observations concerning his prostheses.

The clinical material consists of patients with partial dentures, examined before fitting and followed up for about one year, and other patients checked some six years after the fitting. The follow-up group comprises 198 patients with mandibular partial dentures and 74 patients with maxillary partial dentures. The check-up group comprises 118 patients with mandibular dentures and 60 with maxillary dentures.

The material for histologic study comprised specimens of the gingival margin taken from 28 patients in connection with the removal of a tooth within the sphere of influence of the prosthesis.

The material studied roentgenologically com-

prised pantomograms of the patients clinically investigated; 476 measurable pictures were obtained.

It was found that the gingival pockets increased in depth during the follow-up period both among those wearing and those not wearing their dentures. The incidence of exposed cementoenamel junctions, on the other hand, seemed to be higher among those wearing dentures than among those not wearing dentures. The mobility of the tooth was found to increase in the mandible only, and even then only to a limited extent. Inflammation of both the gingival margin and the edentulous regions and the palate were noted fairly frequently among those wearing dentures "always." Those wearing dentures only during "daytime" showed a lower incidence of inflammation, and among those wearing dentures "never" the inflammations were found to have healed in many instances.

The inflamed spots showed histologic signs peculiar to chronic inflammation, sometimes even in clinically healthy mouths. On the gingival pocket side the epithelium often was less regular and appeared more severely inflamed than on the oral side. In both the clinically healthy and the inflamed groups, variations in the thickness of the tissue were so great that the differences in thickness could not be classified.

The dentures had become traumatizing in the follow-up period of one year in a remarkably large number of patients. Among patients who had worn their dentures for six years, no instance of balanced articulation was noted. In most instances the dentures had loosened; this was a frequent cause of complaint.

The disappearance of balanced articulation in the prostheses is one of the signs of bone resorption. Measurements made on the pantomograms revealed it in a number of patients at the edentulous ridges. Loss of bone also occurred at the roots of the remaining teeth.

Several changes occur in connection with mucosa-borne partial dentures. In particular, there was inflammation of the mucous membranes and gingival margins underlying the dentures; this was associated with deepened gingival pockets and exposed cementoenamel junctions. In addition, there was bone resorption which resulted in the loss of balanced articulation. In spite of the fact that the changes were both numerous and considerable, patients failed to complain of them; the most frequent causes of complaint were broken dentures and loosening of dentures.

The bibliography lists 152 references.

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▼ Crown and bridge

Principles of the Pontostructor method

Karl A. S. Karlstrom. *Harvard D.Alumni Bul.* 17:19-22 Jan. 1957

The Pontostructor method is a method for facilitating and standardizing crown, bridge and inlay work, and increasing the accuracy of the work. This is done with the aid of an apparatus called the "Pontostructor," which is essentially an intraoral paralleling device. The six principles for the construction of fixed bridges by the Pontostructor method are as follows:

1. Parallelism. Strict observance of parallelism when preparing the abutment teeth is made possible.

2. Scheduling of operative and laboratory procedures. The preparation of all the abutment teeth in the bridge and the taking of the impression can be carried out at one appointment. The bridge then can be built up entirely on the working model without further try-ins.

3. Coverage. When the abutment teeth are prepared, the finishing line of the preparation should be brought to within about 2 mm. of the gingival margin on the lingual surface.

4. Impression. The impressions are taken in elastic hydrocolloid.

5. Rubber dam. The impressions are taken and the bridges cemented with the rubber dam ligated in place.

6. Dies. From the soft impressions of the prepared teeth, accurate dies are made in a material that is hard enough to permit the cast crowns to be tried on them and the bridge completed on the working model without damage to the dies.

The dies are made directly in the hydrocolloid impression.

The author's report was delivered before the Harvard Odontological Society as an introduction to a movie produced by the author. The film shows the construction of two fixed bridges in the same mouth, both completed within four days by the Pontostructor method.

Gävle, Sweden

▼

Complete dentures

Materials used in the present-day manufacture of artificial teeth

(Welches Material dient heute zur Herstellung künstlicher Zähne?)

Konrad Gatzka. *Umschau* 57:11-13 Jan. 1, 1957

The history of prosthetic dentistry may have begun at the dawn of mankind. Although no mummies of ancient Egypt have been found in which absent teeth had been replaced artificially, the excavated skulls of ancient Greeks, Persians, Romans, Etruscans, Phoenicians, Chinese and Japanese show several types of tooth replacements. Of those, the Etruscan and Phoenician prostheses are the best examples.

In 1708, the French pharmacist, Ducateau, was the first to form a denture of porcelain paste which was baked at the Royal Porcelain Works Guerard in Paris.

The foundation for the modern production of artificial teeth was laid by the Italian dentist, Fonzi, who used these teeth in dentures as early as 1804, but announced this development in 1808. These teeth had platinum brackets baked into the procelain and were soldered with gold to platinum posts. Ordinarily, Fonzi used platinum for the base.

In 1860, the American, Putnam, introduced a vulcanizer. Vulcanite had been used for denture bases to some extent since 1840, and had come into general use by 1860.

The present-day world production of artificial teeth totals 450,000,000 a year of which about 30,000,000 are manufactured in Germany, about half of which are for export.

Baked porcelain for restoring lost teeth satisfies the esthetic demands of both the dentist and the patient. This material is the only one which permits a facsimile closely resembling the natural tooth in shape, luster and color.

In addition to porcelain, different types of methacrylates have been used recently to produce artificial teeth. Coloring ingredients, mainly oxides of various metals or the metals in the form of finely ground powders, are added to these materials.

The substances listed below, mixed with the basic methacrylates, produce the following colors, shades and tints: (1) ammonium chloropatinate = blue; (2) platinum filings in a spongy condition = greyish blue; (3) gold filings = red and pink; (4) peroxide of gold = flaming red; (5) purple of Cassius = purple red; (6) oxide of titanium = brilliant yellow; (7) oxide of uranium = orange; (8) zinc oxide = clear yellow; (9) manganese oxide = bluish red; (10) cobalt oxide = clear blue; (11) silver oxide = pale lemon yellow, and (12) ammoniac platinum bases = green.

If the tooth restoration, either partial or complete, is to be done scientifically, the natural condition of the patient's mouth must be studied in order to create a functional and esthetic denture.

When all the variable factors are considered which enter denture construction, tooth production and arrangement, the fallacy of previous technics in which there was an arbitrary selection and arrangement of artificial teeth can be seen readily.

The dentist should select artificial teeth with the same care he selects his instruments. By evaluating correctly the individual requirements and oral conditions, he will be able to utilize to good advantage the various types and forms of artificial teeth available.

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Oral surgery

▼

Fractures

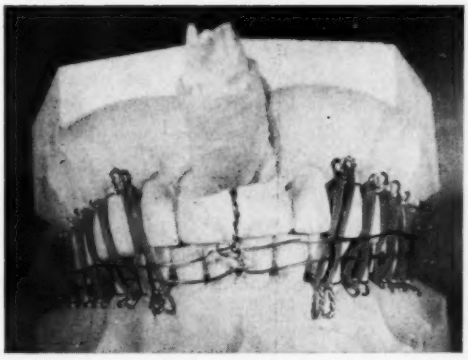
Improved ripcord for release of intermaxillary elastic fixation

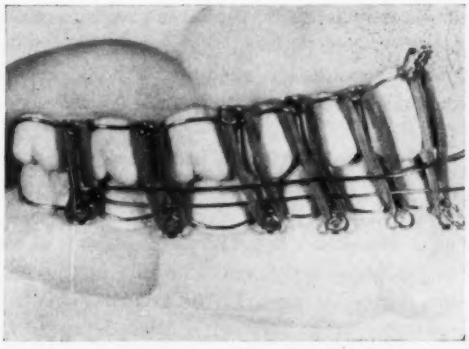
James M. Strickland. *U.S.Armed Forces M.J.* 7:1344-1346 Sept. 1956

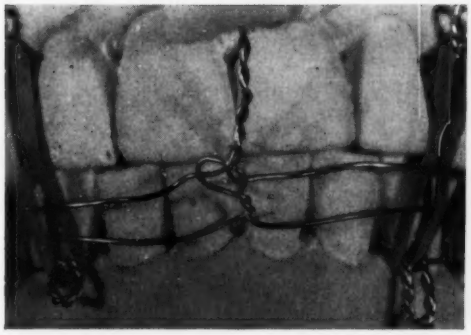
The several reported types of ripcords for quickly removing intermaxillary elastic fixation in persons with fractured jaws are effective but require that two ripcords be pulled, one for each side of the mouth. Because of the physical urgency and acute mental anxiety experienced in vomiting, and the mental awareness of the physical limitation of opening the mouth after fixation of the fracture, it is important that there be only one ripcord for the patient or an assistant to locate and pull.

In the proposed improved technic (illustration, above left and right), a single ripcord wire is passed through, rather than lingual to, all intermaxillary elastics so that the pull will be on the distal extent of each elastic. In this way, some of the elastics will be pulled off the intramaxillary loops while others will be severed by the wire.

One end of the ripcord is passed through the intermaxillary elastics from anterior to posterior on one side of the mouth and is brought anteriorly facial to all the elastics out through the mouth orifice. The other end is inserted in a like manner on the other side of the mouth. There are thus two ends extending from the mouth, and the middle section of the wire is anterior to the anterior teeth. These two ends and the middle section are secured together in the midline of the mouth to effect a single ripcord. A method of securing the wire is shown in the illustration, below.







Above left: Anterior view of ripcord showing adhesive tape knob that facilitates pull

Above right: Right lateral view of ripcord showing relation of wire to elastics

Below right: Anterior view of a method of securing wire for most advantageous pull on elastics

At the Scott Air Force Base a ripcord is inserted in the mouth of each patient requiring intermaxillary fixation. It is left in place for the first few days while he recovers from general anesthesia, adjusts to the difficulties of eating, drinking and talking with the mandible fixed, and until the traumatic edema has subsided. The ripcord also is inserted in all patients leaving the hospital prior to removal of intermaxillary fixation.

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▼ Plantation

Subperiosteal gold-mesh implantation completed in one appointment

(Die subperiostele Goldnetzimplantation in einer Sitzung)

A. Schroeder. *Schweiz.Mschr.Zahnhk.* 67:23-29 Jan. 1957

The subperiosteal implantation of substructures made of gold meshwork to support bridges or partial dentures has obtained far better results in practice than had been thought possible theoretically.

These implants usually are cast from cobalt-chromium alloys (for instance, Vitallium). Construction and insertion require a two-stage procedure. In the first stage, an impression of the surgically exposed bone and of the surrounding soft tissues is taken. In the second stage, the cobalt-chromium implant, which has been constructed in the meantime, is inserted, and the incisions sutured.

Some of the disadvantages of such a two-stage procedure can be avoided if J. Dora's technic (modified and improved by L. Marziani and W. Flohr) is used.

The author, not completely satisfied with this solution, tried to discover whether the subperiosteal implantation technic could be simplified to make it applicable for daily practice.

Even by using the Dora-Marziani-Flohr method, the completion of the implantation in one stage is hardly possible because of the special instrumentation required and the surgery involved, whether the material used is cobalt-chromium, as suggested by Dora; sheet tantalum, as described by Marziani, or "Remanit" sheets, as reported by Flohr.

With gold-meshwork used throughout, and the attachment of a pivot for isolated teeth, no special surgical procedure or laboratory technics are needed. The entire procedure of constructing and inserting a gold-mesh implantation in the mandible requires only a single appointment.

The surgery on the periosteum and mucous membrane is performed in the customary manner. An impression is taken of the exposed alveolar bone, and poured in self-curing acrylic resin.

On the acrylic model, the gold-mesh substructure is designed, cut to proper size, and adapted to the model by hammering. The superfluous parts are eliminated and the necessary pivots (one for each tooth) attached.

After 15 minutes of heat treating, and an additional working time of about one hour, the implant is ready to be inserted. The flaps are sutured toward the cheek, beginning at the alveolar crest. Only a comparatively small incision is required for the insertion of the implant which, after having been set securely, is covered with the lingual flap.

In the case reported (one of many), the patient, an 80 year old man, wore a complete upper denture and in the lower jaw a bridge replacing the right bicuspids and molars. Because the insertion of a lateral free-end denture was difficult (the patient wanted to keep his bridge intact), a subperiosteal gold-mesh implant as support for the denture was indicated.

Under regional anesthesia, the alveolar bone was exposed. It was observed that the periosteal flaps of the mucous membrane were extremely thin, endangering the success of an implantation. After a rubber cement impression was taken, an acrylic (Palavit M) model was made. During the construction of the gold-mesh implant, the flaps were temporarily laid over the wound and kept sterile with a physiologic sodium chloride solution.

After the implant was inserted, two incisions were made into the lingual flaps for the pivots. The flaps then were sutured. Small acrylic buttons covered the pivots to protect the tongue

against chafing. One intravenous injection (400,000 units) of penicillin was sufficient to prevent postoperative infection.

After one week, the sutures were removed, and the patient dismissed.

Many other similar subperiosteal implantations in which gold-mesh substructures were used have been performed successfully.

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Transplantation and replantation of tooth germs: a Hungarian method

(Neues Verfahren zur Einsetzung von fehlenden Zähnen in Ungarn: Die Einpflanzung von Zahnkeimen)

Miklós Scerépfalvi.
Österr.Zschr.Zahnhk. 10:196 July 1956

Transplantation and replantation of teeth have been recorded in the early history of dentistry. Recent articles report the successful transplantation of human tooth germs. Few histologic observations accompanied these reports, however, so whether viability of tissue existed after transplantation could not be determined.

The Hungarian Central Dental Institute in Budapest undertook preliminary experiments in transplantation and replantation of dental germs in dogs and hamsters. It was observed that in some instances an attachment of the periodontal membrane and of embryonic tissue had taken place. In the majority of instances, the osseous connection (ankylosis) between the implanted and now growing tooth and the alveolar bone occurred.

After the encouraging results in the animal experiments, tooth germs were transplanted in 16 patients of different ages, and it was established that transplantation and replantation of human tooth germs could be performed successfully.

Histologic examination revealed that, in the majority of instances, regeneration of tissue occurred. The periodontal membrane appeared to be firmly attached over almost the entire surface of the newly developed tooth roots, although some resorption was evident in both the cementum and the alveolar bone.

In some regions, fibrin and plasma from blood clots were present. The pulp showed no evidence of cellular degeneration and possessed normal living tissue with healthy odontoblasts in the root canals. The collagenous fibers, however, were not as strong as in normal erupted teeth. The vascularity did not differ from that of normal pulp. In a minority of instances, there was no indication of regeneration although the periodontal membrane was firmly attached.

The transplantation and replantation of tooth germs are comparatively easy. The extracted or missing diseased tooth is replaced by a healthy tooth germ transplanted into the alveolus. The gingiva is closed with two sutures. After the tooth germ has taken root and become firmly imbedded in the jaw, the tooth will erupt normally.

The intact tooth germs originated from superfluous tooth germs eliminated in extractions of deciduous teeth of the same patient or other patients. It was established that properly preserved tooth germs become neutral and adapt themselves readily to the new environment.

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▼ Extractions

Use of hyaluronidase in oral surgery

D. L. Goodridge. *J. Roy. Nav.M.Serv.* 42:83-86 Spring 1956

A satisfactory method to control postoperative edema and trismus consequent to extractions of third molar teeth has long been sought. After the reports of Benzen (1951, 1952) and Devine (1954) and Young and Kingsbury (1955), it seemed likely that an avenue of research was opened by preventive injections of hyaluronidase after completion of oral surgery. A clinical test using Hyalase (Bengers Ltd.) was instituted on a series of patients operated on for removal of third molars.

The rationale was that after surgical removal of impacted third molars the postoperative trismus and edema were two constant factors, unpredictable and more or less uncontrollable in extent. Trismus, especially if not previously experienced,

seems to distress the patient. As the majority of postoperative edemas are due to an extravasation of blood into the tissues, it was felt that hyaluronidase with its penetrating and dispersive powers, injected at operation into the regions where hematomas normally develop, would help to decrease the swelling and trismus. It was not intended to confirm previous findings on hyaluronidase used 24 hours after operation, but rather to attempt to prevent trismus and edema.

One thousand units of Hyalase were dissolved in 1.5 cc. of sterile normal saline solution, and injected into the masseter muscle above the wound and anteriorly at the level of the bicuspids buccal to the sulcus. It was administered to 32 consecutive patients. In bilateral impactions, the injections were given on the side which was more severely afflicted only, the lesser afflicted side acting as a control.

Of the eight operations comparable in surgical severity, in one instance the injected side was more edematous than the other, although the extent of bone surgery was the same, but there was a severe bleeding point during operation which was crushed but not tied off. In the other seven operations the injected side was the more comfortable.

In a difficult instance the patient remarked on the pain and trismus on the less afflicted side and had no discomfort on the other side into which hyaluronidase had been injected.

In moderate instances there was mild edema on the moderate and injected side but no trismus. In all instances the edema was soft and had dispersed in 48 hours and was less severe than had been reported previously.

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Indications for the extraction of a tooth

Gilbert J. Parfitt. *M.Press* 236:395-398
Oct. 24, 1956

The indications for tooth extraction in the course of dental practice are as follows:

1. Teeth are extracted on account of dental caries when so much tooth structure is lost that restoration is impossible, mechanically unsatisfactory or unjustifiable, or where the pulp is involved and pulp treatment or root canal filling is impractical.

2. Teeth are extracted where the loss of a tooth would assist materially the cleanliness of the mouth, where progressive bone loss and mobility cause the tooth to be functionless, and where infected pockets about the tooth cannot be eliminated efficiently or satisfactorily by any other means. Unless the patient suffers from some chronic disease, however, in which event normal healing is upset, it is possible to eliminate most periodontal disease without tooth extraction.

3. Permanent teeth are removed in a child where the teeth are too large for the predicted size of the jaw or are misplaced. Deciduous teeth are removed where so much tooth structure has been lost by caries that restoration of the crown to maintain space in the dental arch is impractical; where the tooth interferes with eruption of the permanent successor; where there is an infection present which cannot be cleared rapidly by other means, particularly if the child is in poor health, and where the child is an extremely difficult subject, such as one with spastic paralysis, under which circumstances normal procedures in the dental chair are impossible.

4. In prosthetics, teeth are extracted where a remaining tooth jeopardizes the wearing of a comfortable and mechanically efficient denture; for example, where the teeth are grossly tilted, functionless and unhygienic.

5. Anterior teeth are extracted when they are so misshapen, hyperplastic, discolored or displaced that they cause embarrassment and are impossible to crown.

6. A change in a patient's general condition or an alteration in the reactions of the tissues in relation to healing or the combatting of infection constitute an important indication for a further assessment of the likely value of a tooth to the patient in the future. An important instance of this is when roentgenotherapy is contemplated. Another instance would be a prolonged, debilitating disease in which oral health could not be maintained easily.

7. Extraction of teeth on medical grounds revolves about the problem of focal infection. The accuracy of diagnosing a septic focus in the mouth is of considerable importance.

Extraction of a tooth is contraindicated when there is a pericoronitis present, for the acute infection which is localized in the soft tissues is introduced into the bone with avulsion of the tooth, and many instances of osteomyelitis of the mandible have followed this procedure. Removal of teeth in the event of fracture of the mandible or maxilla may cause considerable trauma to the fractured region and may discard needlessly a valuable means of immobilization. Extraction of teeth to allow space for feeding during the immobilization of the jaws is absolutely unnecessary. In patients with cleft palates, the extraction of misplaced teeth should be performed only by those responsible for the entire care.

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The split bone technique for removal of lower third molars

Terence G. Ward. *Brit.D.J.* 101:297-304 Nov. 6, 1956

The split bone technic for removing impacted mandibular third molars was evolved and introduced by Sir William Kelsey Fry. The technic has the following advantages: (1) it is one of the quickest methods of removing an impacted tooth; (2) by largely eliminating the distolingual bone, the technic allows the lingual tissues to fall in and eliminate much of the large dead space, and (3) the operation is comparatively atraumatic. The bone is clean, fresh cut, and there is little or no late sequestration.

The operation is performed under local or general anesthesia, depending on the judgment of the surgeon and the facilities available. Preoperative scaling and cleansing are essential. Immediate preoperative toilet is carried out with a soapy detergent.

Two types of incisions are used, as follows:

1. The anterior line of the incision runs from the distal aspect of the second molar, curving downward and forward to the level of the apex of the distal root of the first molar. To avoid meeting blood vessels which produce significant hemorrhage, the posterior line is made with a pair of curved scissors rather than with a knife.

2. The second type of incision is used when the roentgenogram shows that the crown of the third molar overlaps the second molar on its lingual aspect. The posterior part of the incision is the same, but the anterior part commences at the junction of the anterior and middle thirds of the second molar and runs down to the apex of the distal root of the first molar.

The mucoperiosteum is reflected with a periosteal elevator which is best applied at the anterior part of the incision. The tissues are reflected buccally, distally and lingually, exposing the bone and tooth from all aspects.

In the mandible, the grain runs in the long axis of the bone; horizontally in the horizontal ramus and vertically in the vertical ramus. Any split in this bone will tend to extend beyond the points required.

Accordingly, the first chisel cut is a vertical "stop cut," effected with a 3 mm. chisel used with the flat surface facing anteriorly. The cut is made parallel to the long axis of the second molar and immediately distal to it. The cut is made through the buccal cortical bone and is carried as far toward the lower border of the mandible as required. The chisel is then placed with its beveled edge downward, and a cut is made at an angle of 45 degrees to the initial vertical cut in such a way as to form a V. The chisel is driven through the buccal cortical bone and is then twisted, splitting a triangular piece of bone from the mesiobuccal aspect of the third molar. This should allow the application of an elevator under the tooth.

To remove the distolingual bone, a 5 mm. chisel is placed distal to the third molar, with the beveled side upward and the cutting edge parallel to the external oblique ridge. The chisel is driven in to the depth required, and is removed and replaced with the beveled side downward. The cut is not carried through the lingual plate, but at a selected depth the chisel is twisted and the bone splits obliquely backward. When the bone is split, the chisel is twisted farther and the lingual plate breaks anteriorly at its thinnest point. This is where the crown of the third molar is nearest to the lingual surface. The wedge-shaped piece of bone which has split off is removed, and the entire distolingual aspect of the impacted tooth is exposed.

After the tooth has been delivered, sharp edges of bone are removed with a pair of bone nibblers, and any spicules washed out with saline solution. The soft tissues are repaired with one or two sutures of .00 black silk.

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Oral surgery complications caused by flight

Lucian Szmyd. *U.S.Armed Forces M.J.* 8:264-270 Feb. 1957

Changes in atmospheric pressure created during aircraft flight may produce undue stress on the antral membrane of an abnormal sinus when it is devoid of bony support. The oral surgeon should be aware of the physical factors encountered during flight which may affect adversely the postoperative course in patients from whom considerable alveolar bone is removed during the extraction of posterior maxillary teeth. In instances where alveolar bone is lost in the vicinity of the antrum, roentgenograms should be obtained to evaluate the condition of the sinus. Whenever infection or other abnormalities are noted, treatment should be recommended and the patient advised against air travel.

A 23 year old airman was referred to the oral surgery service with a large oroantral fistula. Six weeks prior to admission, the right maxillary first and second molars were extracted. Considerable alveolar bone had been removed, and the patient had been cautioned against blowing his nose or sneezing. Healing was uneventful until the patient took an airplane flight one week after the operation. After landing, the patient noted a large mass protruding into his mouth at the extraction site. A diagnosis of a herniated antral membrane was made, the tissue was excised and the patient referred to the oral surgery service for treatment.

Clinical examination revealed an oroantral opening 1 cm. in diameter in the region of previous extractions. A probe passed readily through the opening into the right maxillary sinus. A large polyp was obstructing the opening, but no evidence of drainage from the maxillary sinus was noted. Roentgenographic examination revealed a generalized opacity of the right antrum.

From clinical and roentgenographic evidence it appeared that three conditions had existed prior to air travel: (1) infection of the maxillary sinus; (2) lack of bony support for the antral membrane in the region of the herniation, and (3) a defect in the integrity of the oral mucous membrane in the region of the herniation.

Under general anesthesia a Caldwell-Luc approach was used to enter the right maxillary sinus. Polyps and purulent exudate were removed, and a nasoantral window was made. The antrum was packed with iodoform petroleum jelly gauze. The end of the pack was passed into the nasal cavity, and the original incision was closed without drainage. After de-epithelization of the fistulous tract, a subperiosteal palatal flap containing the anterior palatine artery was provided to close the oroantral fistula. A surgical acrylic splint, constructed prior to surgery, was adjusted and inserted. The postoperative course was uneventful. Roentgenographic examination, four months postoperatively, revealed that the right antrum had cleared.

Had the patient been warned to avoid air travel, the herniation probably would not have occurred.

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Profound bleeding after dental extractions during Dicumarol therapy

Albert M. Ziffer, Irwin F. Scopp, Jan Beck, John Baum and A. R. Berger. *New England J.Med.* 256:351-353 Feb. 21, 1957

Two cases are reported in which dental extraction, during the course of protracted bishydroxycoumarin (Dicumarol) therapy, was followed by excessive and serious bleeding.

The potential seriousness of dental hemorrhage is emphasized by the little-appreciated fact that blood loss during some oral surgical procedures is comparable with that incurred in major surgical operations. Experience at the New York Veterans Administration Hospital suggests that anticoagulant drugs be withheld before dental operations, although various surgical procedures have been done, deliberately or unwittingly,

without hemorrhagic complications on patients receiving this therapy. The risk of recurrent thromboembolism (which, if it occurs, does so most often weeks after cessation of therapy) is less to be feared than the hazard of serious postoperative bleeding. Prompt resumption of therapy, when hemostasis is certain, produces minimal interruption of anticoagulation.

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▼ Anesthesia and analgesia

Anesthesia in pedodontics

(Die Analgesie bei der Kinderbehandlung)

Helmut Pfeifer. *Österr.Zschr.Stomat.* 53:272-273 July 1956

Cooperation between pedodontists and anesthesiologists at the Dental Clinic of the University of Heidelberg during the past decade has contributed much to the knowledge and applicability of anesthetics, especially in the use of ethyl chloride as a general anesthetic in treating child patients.

Ethyl chloride is used at the Dental Clinic of the University of Heidelberg for minor operations, cleft lip and cleft palate surgery on children up to an approximate age of 12 years, in the form of a spray to produce local anesthesia by refrigeration. The anesthetic procedure does not require a maintenance period and can be carried out within a two minute period by either an open or closed method.

The 12 year age limit for anesthesia with ethyl chloride is not standard. The physique of the child is a more important factor in the selection of an anesthetic agent than the chronologic age. No definite age limit should be placed on the use of ethyl chloride anesthesia, but in most instances children between 9 and 12 years are either mentally amenable to local anesthesia or may be better served by general anesthesia.

There are few actual contraindications to the use of ethyl chloride. Any known systemic disorder, particularly those of the heart, lungs and kidneys, should be evaluated carefully before this anesthetic is selected.

In the age group of from three to five months, all operations on hereditary cleft lip were performed successfully under nitrous oxide anesthesia. The same anesthetic was used in the age group of from one to two years.

Conservative treatment was carried out in children of from four to ten years under middle stage analgesia. To avoid failures, premedication was used (applied rectally by suppositories). Previously fearful and hypersensitive children became calm through the use of anodynes.

Clinical experience proves that both ethyl chloride and nitrous oxide-oxygen (80:20) can be used in pedodontics.

The response of patients, parents and nurses was enthusiastic. After surgery, the children slept for from two to three hours and awaked refreshed, hungry and with no recollection of the surgical episode.

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Succinylcholine as an adjunct to general anesthesia in the dental office

Robert Shirley Locke. *J.Canad.D.A.* 23:82-88 Feb. 1957

A study was conducted during dental operations performed in the dental chair on 103 ambulatory patients. The first 52 procedures utilized succinylcholine chloride as an adjunct to the general anesthetic. The other 51 patients who did not receive succinylcholine chloride were used as a control group. Thiopental sodium in a 2 per cent solution was used in combination with nitrous oxide and oxygen and trichloroethylene. All patients underwent a rapid, smooth induction. There were no instances of untoward reactions to thiopental sodium on administration of a test dose.

When succinylcholine was used, 2 to 3 mg. per minute would usually produce relaxation without respiratory depression. In the 52 instances in which succinylcholine was used, in ten it was necessary to administer added doses of thiopental sodium during the procedure to main-

tain the level of anesthesia necessary to continue the operation. All of these instances exceeded ten minutes in duration. In the control group were 31 instances which required added thiopental sodium during the procedure. Ten of these did not exceed ten minutes.

In the patients receiving succinylcholine, severe movement occurred in 2, moderate movement in 9, slight movement in 28 and no movement in 13. In the control group, movement severe enough to interfere with the operation occurred in 26, moderate movement in 10, slight in 11, and no movement in 4.

The average recovery time for patients in the succinylcholine group was nine minutes longer than the anesthetic time; in the control group, the average recovery time was almost 12 minutes longer.

Thirty-nine of the group who received succinylcholine experienced an uneventful recovery, 8 had varying degrees of postoperative nausea and 3 complained of a slight degree of muscular weakness for a short period. In the control group there were 38 uneventful recoveries, 13 experienced nausea and none complained of postoperative weakness.

No significant alteration in blood pressure or pulse occurred in either group.

Muscle relaxants, particularly the short acting succinylcholine chloride, have a place in office anesthesia. Succinylcholine is not an anesthetic agent but rather an adjunct for muscular relaxation. The administration of succinylcholine demands the undivided attention of the anesthetist at all times. Only trained anesthesia personnel should employ the muscle relaxants. These drugs should never be employed unless necessary equipment to oxygenate the patient is available.

Fatalities following topical applications of local anesthetics to mucous membranes

John Adriani and Donovan Campbell. *J.A.M.A.* 162:1527-1530 Dec. 22, 1956

Untoward reactions, and even fatalities, occur more frequently when local anesthetics are used topically than when they are administered by other routes. Rapid absorption has been presumed to be the cause, but data in support of this contention have not hitherto been available. Blood level studies of tetracaine hydrochloride are reported that show that rapid absorption does occur, and at a more rapid rate than had been supposed.

Blood levels (in dogs in the laboratory) were determined after the absorption of tetracaine hydrochloride from mucous surfaces of the pharynx, trachea and bronchi. These levels were compared with those obtained after rapid intravenous infusion of tetracaine hydrochloride. The rapid injection of 6 mg. per kilogram of body weight of tetracaine hydrochloride intravenously results in peak levels of 100 micrograms or more per milliliter in the circulating blood within one to two minutes. The same quantity applied to the mucous membranes of both pyriform fossae of the pharynx or inserted into the trachea resulted in peak levels of 30 micrograms per milliliter. The peak was attained within four to six minutes. The peak was not as high, nor did it rise as abruptly, as was noted after rapid intravenous injection, but obviously it simulated it closely.

Identical blood levels were obtained when the total dosage in milligrams remained constant but the concentration was varied from 2 per cent to 4 per cent. Thus, the blood level is a function of total dosage and not of concentration.

In studies conducted in 23 volunteers, it was observed that the order of duration and degree of numbness experienced for topical anesthetics applied to the mucous surfaces of the palate, lip, site of the tongue, and the fauces is as follows, in descending order: tetracaine hydrochloride, cocaine hydrochloride, lidocaine hydrochloride, piperocaine hydrochloride, hexylcaine hydrochloride, benzocaine, tripelennamine hydrochloride and pramoxine hydrochloride. A latent period precedes the onset of local anesthesia, whether the agent is topically applied or injected. The longest period preceded tetracaine hydrochloride, the shortest, benzocaine.

When a drug is applied topically, a maximum total dosage must be decided on that must not be exceeded at any one sitting. Tetracaine hydrochloride is considered to be ten times more toxic than procaine hydrochloride. On the basis that 1 Gm. of procaine hydrochloride is the maximum quantity recommended for infiltration, it follows

that 100 mg. of tetracaine hydrochloride must not be exceeded for infiltration. Furthermore, when topical application is used, allowance must be made for the greater ease of absorption from the mucous membranes. The total quantity should be considerably less than that used for infiltration.

The unfavorable reactions are caused by the rapid passage of the drug from the site of application into the systemic circulation. Study of the fatalities that have occurred indicates that the cause of death was overdosage from rapid absorption.

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▼

Surgical technics

Tuberculous osteomyelitis of the mandible: report of a case

Ian McD. Allan. *Brit.J.Plast.Surg.* 9:240-245 Oct. 1956

A 26 year old man in June 1953 first noticed a swelling above the angle of the mandible on the right side. The swelling gradually increased in size and was associated with trismus and slight pain. About three weeks after the onset of the condition, spontaneous intraoral discharge occurred in the region of the mandibular right molars. The lower right first molar was extensively carious, and this tooth and the third molar were extracted on July 9, 1953.

The swelling decreased only slightly in size, and four days later discharge from the third molar was profuse. On July 15 the swelling was incised externally and a considerable amount of pus was evacuated. Improvement followed, but intermittent discharge continued. On August 6 roentgenographic examination revealed a large abscess cavity in the ascending ramus of the right side of the mandible with destruction of the posterior border and active pulmonary tuberculous infiltration in both mid and upper zones with extensive bilateral cavitation.

Routine antituberculous chemotherapy was initiated. Bacteriologic examinations of pus from the external sinus revealed nothing of significance until October 12 when alcohol-fast, acid-fast bacilli were identified from a culture. On October 21 a guinea pig previously inoculated was found positive for tuberculosis. The patient was now complaining of considerable pain in the mandible, and his general condition was deteriorating. It was decided to operate on the mandibular lesion.

The teeth were scaled and cast metal cap splints were fitted, with provision on the left side of the lower splint for a training flange to control the subsequent deviation of the mandible. The operation was performed on November 7 under general anesthesia, the right ascending ramus being exposed through a submandibular incision. A full-thickness defect of bone, just below the mandibular notch, was 1.5 cm. in diameter and filled with pinkish-gray granulation tissue. The surrounding bone was so extensively diseased that resection of the whole of the ramus distal to the angle was carried out.

The results of radical excision were eminently satisfactory. Healing was rapid. The improvement in the patient's general condition was excellent and was maintained. The intermaxillary fixation was removed on December 20, a guiding flange was replaced by a smaller training flange, and two weeks later the patient had overcome any tendency of the mandible to deviate to the defective side. The flange was then discarded. There was no deviation of the mandible on opening and full masticatory function was achieved quickly. There were minimal scarring and facial deformity. When the patient was last seen two and a half years after the resection of the mandible, he was ambulant and the improvement in his general condition was maintained.

Tuberculous osteomyelitis of the mandible is most uncommon. The diagnosis can be made with certainty only by the identification of the tubercle bacillus from the lesion. The result of treatment in this instance emphasizes the view expressed by Evans (1952) that elective surgery of tuberculous osteomyelitis need no longer wait for quiescence of the disease. If after a trial period with chemotherapy alone there is no improvement in the bony lesion, radical excision should be carried out.

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Orthodontics and pedodontics

▼

Pedodontics

Aspects of child psychology in pedodontics (Aspectos de psicología infantil en odontopediatría)

B. Gómez Herrera. *Rev.fed.odont. Colombiana* 7:349-366 July-Aug. 1956

The study of the psychology of children who come to a dental office is indispensable if the confidence, respect and cooperation of the patients are to be gained. The bad behavior of children in dental offices has been greatly exaggerated, and children have been underestimated and labeled "problem children" and other things.

A study of the personality, the behavior and the emotional reactions of child patients in relation to their environment and their education enables dentists to classify them as normal and abnormal. Normal children may be fearful, shy, timid or aggressive with respect to the dentist. Abnormal children may be physically handicapped or mentally ill, which fact should entitle them to the tolerance and understanding of dentists.

When a child is in a dental office, the age, the psychological type, and the circumstances of the patient should be taken into consideration. In general, if treated according to their age and their psychological patterns, children become excellent, cooperative patients. Their cooperation is accomplished by the third visit to the office, and it makes unnecessary the use of premedication or tranquilizers.

Children under three years of age should be amused and distracted during the treatment. Children over five years of age behave well if their self-respect is stimulated. There are no "problem children" for dentists, whereas there are many "problem parents" and many "problem dentists."

The most frequent types of "problem parents" in a dental office are those who try to either divert or punish the patient, and those who cry with the patient or else try to help the dentist during the treatment. "Problem parents" are a great annoyance to the dentist. They should be asked to cooperate by leaving the patient and the dentist alone and leaving the room until the treatment is over.

Only through a knowledge of child psychology on the one hand and of the responsibility of the dental profession on the other can the relations between child patients and dentists be harmonious and the treatment successful.

Carrera 13, Numero 41-58, Bogotá, Colombia

1 *Funeral-like procession of family as child enters dentist's office*
2 *As the dentist sees the child*
3 *The dentist who pretends to cry with child*
4 *The dentist who plays the clown*
5 *The oversolicitous dentist*
6 *The timid dentist who does not dare do anything for the child*
7 *Normal examination*

1

2

3

4

5

6

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Pulp capping with calcium hydroxide and penicillin

Norman Feitelson. *J.Den.Children* 23:214-218 Fourth Quart. 1956

Eighty-three teeth with carious pulp exposure were treated by pulp capping and observed for a period of from one year to seven years and four months. Patients with an exposed pulp were accepted at random, regardless of the size of the exposure. Teeth in which the pulp exhibited any evidence of impairment of vitality were not treated, however. A history of spontaneous or prolonged pain, absence of bleeding on exposure or probing, or periapical bone changes were considered evidences of impaired vitality.

All operative treatment was carried out under local anesthesia. Carious dentin was removed completely, and the cavity was irrigated with a stream of tap water and dried. The exposed pulp was covered with a paste consisting of a mixture of calcium hydroxide and crystalline penicillin G (about 10,000 units) in one drop of water. In the later stages of the study, the paste consisted of an aqueous suspension of methylcellulose with penicillin. The dressing was covered with a soft mixture of zinc phosphate cement, applied without pressure. This cement was allowed to set, and an amalgam filling was placed immediately.

Of the 83 teeth observed for at least one year, 34 were deciduous and 49 were permanent. Seven of the 83 teeth developed acute alveolar abscess or periapical bone change and were considered failures. Of these seven, three were deciduous and four were permanent. These failures became apparent in ½, ¾, 1, 6, 12, 20 and 42 months. The remaining 76 teeth were negative to roentgenologic and clinical examination. Apparently successful outcome of treatment was observed in 91 per cent of the deciduous teeth and 92 per cent of the permanent teeth, with an overall ratio of success of 91.6 per cent.

These results compare favorably with those obtained by other forms of treatment. Since pulp capping is the least complex of the methods advocated for treatment of carious pulp exposure, it is reasonable to consider pulp capping with calcium hydroxide and penicillin as the treatment of choice for carious pulp exposure.

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Congenital dental anomalies occurring in 3,557 children

John M. Clayton. *J.Den.Children* 23:206-208 Fourth Quart. 1956

Over a 12 year period of practice the author surveyed 3,557 patients. Each patient received full mouth intraoral roentgenograms, consisting of four posterior and two anterior films. These films were examined and the occurrence of each anomaly recorded. The following congenital anomalies were detected:

1. Two hundred and fourteen children had 433 congenitally missing teeth; 6 per cent of the children had an average of two missing teeth.
2. Sixty-eight children (1.9 per cent) had 80 supernumerary teeth.
3. Seventeen children (0.5 per cent) had 18 fused teeth.
4. Twelve children (0.3 per cent) had 12 peg teeth.

The most frequently missing teeth in this series were the mandibular second bicuspids and the maxillary lateral incisors. Peg teeth were found only in the permanent teeth and occurred in both right and left maxillary lateral incisors. Supernumerary teeth occurred about twice as often in permanent as in deciduous teeth. Usually, fused teeth occurred only once in each child with this anomaly.

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▼ Orthodontics

Axial inclination of teeth in extraction cases

Robert H. W. Strang. *Angle Orthodont.* 27:11-13 Jan. 1957

The most important reasons for tooth extraction in the treatment of malocclusion are: to assure stability in the final result; to increase functional efficiency; to improve esthetics, and as a measure of prophylaxis to add to the life of the teeth and their supporting structures.

Root movement, for the production of correct axial adjustment, is more important than is generally recognized. Stability depends to a great extent on the correct axial adjustment of each tooth; esthetics also requires that the incisors be properly inclined.

The axial positioning of teeth is dictated by force balance, both functional and environmental. Teeth should not be moved into positions wherein these balanced forces are disregarded.

The linguoaxial inclination of treated incisors, the distoaxial inclination of cuspids and the mesioaxial inclination of second bicuspids are the most frequent manifestations of failure to establish correct axial inclinations. All such teeth eventually are going to readjust to the lines of the force in action on them. They are going to do this by crown movement and not by root shifting.

The crown of an incisor with a linguoaxial inclination will move labially. A space will appear, lingual to the lingual surface of the maxillary crown. This will afford a favorable wedging region for the lower lip in some patients, and this space will enlarge gradually, to upset the esthetic improvement.

The uprighting of a distally tipped cuspid will open the extraction space and coincidentally begin to usurp the incisor region, crowding and rotating the anterior teeth. In the bicuspid region the greatest relapse will be manifested by a recurrence of space in the extraction region.

Technical procedures associated with root movement demand expert manipulation of appliances. Crown positions often must be held at zero which necessitates the application of both lingual torque action and lingual crown pressure to the incisor, mesial tipping action and distal crown pressure against cuspids, distal tipping bends and distal crown force against bicuspids, and mild mesial crown force against molars. Because resistance to root movement is much greater than to crown movement, additional anchorage must be applied to the crowns of certain of these teeth. Either intermaxillary elastics or action derived from an occipital anchorage is an essential adjunct to torque or tipping adjustments of the incisor, cuspid and bicuspid crowns, to keep these crowns from moving forward.

If the maxillary molars are in exaggerated buccal inclination, lingual torque action must be combined with buccal crown force. In the application of buccal or lingual torque to the molar, the arch wire must fit the buccal tubes snugly.

To leave teeth in an axial position of faulty balance is to court instability.

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Some factors determining the evaluation of forces in orthodontics

K. Reitan. *Am.J.Orthodont.* 43:32-45
Jan. 1957

An investigation of the orthodontic forces reveals that some of the main factors are (1) the individual variation in tissue reaction, (2) the type of force applied and (3) the mechanical principles involved. These factors are closely linked.

During the initial stage of a tipping tooth movement performed with continuous forces, cell-free, compressed regions frequently are created on the pressure side of the root even if the force applied is light. The time required for elimination of the compressed region by indirect bone resorption varies from about two weeks to three or four weeks, and occasionally longer. The duration of an indirect resorption process is influenced by the length of the root; a short root is likely to entail a longer period of hyalinization. Intermittent forces of about 70 to 100 Gm. may produce hyalinized regions on the pressure side of the tooth moved, but of a shorter duration than in a continuous tooth movement.

The force exerted in a tipping movement performed with continuous forces will create compressed, cell-free regions in the periodontal membrane more frequently than in a bodily movement, because of the mechanical principles involved. Direct resorption was observed in a torquing movement exerting 130 Gm. of pressure in the apical region.

The appropriate amount of force to be applied may vary considerably according to the type of movement required; about 250 Gm. during the final stage of a continuous bodily movement of the cuspids, and only 25 Gm. in a movement of extrusion of individual anterior teeth should be applied.

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Periodontics and endodontics

▼

Endodontics

Figure 2 Left: An incompletely developed tooth. Right: The tooth, after complete development

Thoughts of a practicing dentist on treatment failures

(Gedanken eines Praktikers zu einem Behandlungs-Misserfolg)

H. Schwarzkopf. *Zahnärztl.Reform* 56:334-338 Sept. 1955

The dental literature usually describes successes; seldom are failures in treatment reported. Knowledge and experience, however, can be gained not only from reports of successful therapy but also from those of errors and failures. Especially in the field of conservative dentistry is the practicing dentist liable to make erroneous diagnoses and be exposed to dangers of various kinds which can be avoided only by clear and logical thinking, biologic proceeding and manual skill.

How often does one read in dental journals about successes that surpass all expectations, achieved with new instruments, new methods and new drugs. Daily practice, however, often proves that the results obtained by application of the new media are contrary to claims and reports.

It is difficult to imagine how dentists about 40 or 50 years ago were able to cope adequately and successfully with diseases and infections, without roentgenology, diathermy, iontophoresis or "wonder" drugs.

The conservative treatment of teeth with gangrenous pulps is one of the most difficult and strenuous tasks in the dentist's practice. How often nowadays is this strain avoided by reaching for the forceps immediately.

From the prophylactic point of view, the filling of a vital tooth is more important than the treatment of a tooth which is either gangrenous or whose roots or root canals are diseased. An inadequate filling, however, can lead to secondary caries, pulpitis, and finally to focal infection. Conservative therapy causes no problem which cannot be overcome by the maxims of the old school: exact preparation, appropriate time, carefulness, precision, accuracy, and conscientiousness.

The following instance may increase knowledge and experience not despite, but because of, the treatment failure described.

The patient, an 11 year old boy, accidentally fractured the edge of his upper left central incisor. The coronal pulp of this tooth was exposed, causing pulpitis. The tooth still was embedded firmly in the alveolus. During the first session, the exposed pulp was treated by application of an arsenic preparation. After two days, the pulp was extirpated and the root canal cleaned and

Figure 1 Exposed pulp caused by trauma

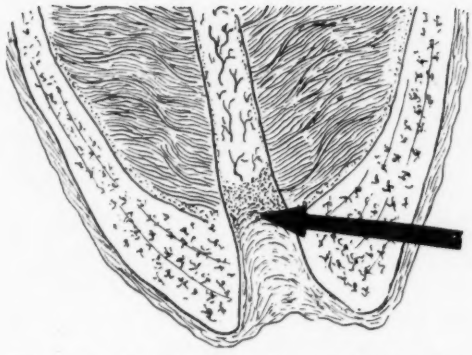

Figure 3 The pulp, even after complete development of the tooth, does not reach the apical foramen

Figure 4 The arsenic acid diffuses the regions lacking in dentin

Figure 5 Axial pressure and acute apical push

treated. Severe disturbances in the periodontal membrane occurred one day later, however. For one week, the tooth was kept open because every attempt at hermetic closure was followed by acute apical inflammation and an abscess formation in the apical region. Finally the tooth became loose, and on the twelfth day of treatment it was easily removed by stump forceps without severe pain. The loss of a central incisor is not only a calamity but also causes a prosthetic problem.

In the roentgenogram (Fig. 1), the wide pulp cavity, the incompletely developed apical foramen, the absence of root cementum, and the rudimentary dentinal particles can be observed. The application of the arsenic preparation had, in fact, caused the first difficulty in the injured tooth, because the arsenic acid diffused the still tender dentinal structure, causing severe injuries to the periodontium.

The second mistake was the premature extirpation of the devitalized pulp. The incompletely developed root structure could not survive the trauma, and the danger of an infection was imminent. The tooth was without the necessary support (cementum), and the fibers of the periodontal membrane were not attached to the constituent particles and tissues. There is an enormous difference between a deciduous tooth of a child and a permanent tooth of an adult. The large pulpal space, the wide apical foramen, and the lack of root cementum are characteristic of deciduous teeth (Fig. 2, left).

Difficulties may begin in the preparation of the smallest cavities and end in severe affections of the pulp. In completely developed teeth, the periodontal tissues reach into the root canals, contacting the pulpal tissues (Fig. 2, right). The pulp itself is not a simple chord of connective tissue but a complicated system of nutritional organs for the tooth and its development (Fig. 3).

The deplorable failure could have been avoided by the use of the following procedures: local anesthesia, coffer dam and extraction under aseptic conditions. An exact extirpation of a coronal portion of a pulp can only be performed if no pressure is applied, and contusion is avoided (Fig. 4 and 5). Such an ablation of the coronal portion of the pulp should be done without the use of any force or pressure on the remaining

pulp. Large drills should not be employed.

The instance reported shows that a conservative therapy should have been preferred, and how such a treatment should have been executed.

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Histopathologic study on natural healing in chronic apical periodontitis

Toshimi Narita. *Bul.Oral Path., Tokyo* 1:163-185 Sept. 1956

To study the natural healing process, 187 instances of chronic apical periodontitis in 16 upper jaws and 18 lower jaws of 26 cadavers were studied histologically at the Laboratory of Oral Pathology of the Tokyo Dental College, with the following results:

1. The traditional opinion that dental granuloma is the beginning of chronic apical periodontitis is wrong. Dental granuloma should be considered as a part of the healing process of chronic apical periodontitis.

2. Both in cause and form, chronic alveolar abscess and radicular cyst are exactly the same. The latter is merely a change in the arrested period of the purulent inflammatory condition in the former.

3. When a chronic alveolar abscess is on the point of healing, it usually changes into a condition that traditionally has been called "dental granuloma." This change occurs as a result of reduction of the inflammation, proliferation of the granulation tissue, disappearance of the abscess cavity and proliferation of the connective tissue layer.

4. When an epithelial dentoalveolar abscess is on the point of healing, if the abscess cavity does not disappear but the purulent inflammation is reduced, the focus of the abscess is transformed into what has long been called a "radicular cyst."

5. The cavity of a radicular cyst sometimes disappears as a result of active proliferation of the surrounding granulation tissue and changes into a dental granuloma.

6. If the granulation tissue proliferates rapidly in dental granuloma, the proliferating tissues proceed into the root canal, frequently forming the so-called "granular root canal polyp."

7. As proliferation of the periapical granulation tissue proceeds, hypercementosis frequently appears at the periapical region of the tooth.

8. As the inflammation diminishes, the surrounding alveolar bone that had been destroyed by the inflammation begins to regenerate and the focus area is restored.

9. As healing of the inflammation advances, the root canal polyp becomes fibrotic and forms a cicatrized root canal polyp. This may close the root canal completely in such a way as to protect the periapical tissue from harmful stimuli.

10. The last healing phase is the natural closing of the apical foramen by the root canal polyp or by proliferation of the connective tissue at the apical region.

11. Besides the afore-mentioned healing processes, there are many instances in which regeneration of the bone trabeculae proceeds slowly, and the foci are filled and closed with fibrous connective tissues without inflammation.

12. The cementum at the tooth apex and the surrounding regions that had been absorbed because of the inflammation are repaired as granulation tissue proliferates. The root surface is restored and becomes the point of attachment of the regenerated periodontal membrane.

13. The surfaces of the tooth root and the alveolar bone gradually approach until they form a new periodontal space into which new fibers of the periodontal membrane may be regenerated to promote the restoration of the normal structure.

14. The fibers of the periodontal membrane which had been absorbed because of inflammation regenerate at first by fibrosis of the granulation tissue. Regeneration is continued by the routine evolution of the fibroblasts.

15. When inflammation is active, so is proliferation of the epithelium at the apical region. When inflammation is reduced, the proliferation is reduced.

16. These findings on the healing changes in human chronic apical periodontitis are exactly the same as those observed in experiments with dogs. In humans, however, healing proceeds more slowly.

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Histopathologic study of effects of various dental cones on the healing process of extraction wounds of experimentally infected teeth

Yoshiaki Honda. *Bul.Oral Path., Tokyo* 1:41-84 Sept. 1956

Infection was produced in the root canals of teeth of a large number of adult dogs. The teeth were extracted and one of the six most widely used dental cones was inserted in the sockets. Histopathologic studies of the wounds were made at different intervals. As controls, other teeth of each experimental animal were extracted and the extraction wounds painted with iodine tincture. One hundred and twenty-three sockets were treated with dental cones; there were 39 controls. The following clinically significant results were obtained:

1. The healing process generally could be divided into four stages: (1) clot formation; (2) granulation; (3) callus, and (4) healing. The application of dental cones seemed to bring about no change in the establishment of these four stages.

2. All the cones were absorbed quickly within the sockets. Most of them could not be detected two days after insertion, even with the aid of a microscope.

3. In most instances, the dental cones retarded the propagation of gingival epithelium and the growth of granulation tissue at the early stage. Once these tissues started to grow, however, they propagated rapidly. Between most of the experiments and the controls, there was almost no difference in the number of days in which the complete growth of these tissues was established. All the dental cones used seemed to impede fibrosis; in some instances, no complete cicatrization was seen after a considerable period.

4. The dental cones strongly inhibited inflammation. Inflammation in the extraction wounds, their alveolar bone and the existing apical infections disappeared much more quickly than in the controls. New growth of bone occurred more quickly in experimental than in control animals.

5. It is difficult to discriminate among the various cone types; each has its own merits and demerits. Cone A, containing 5,000 units of penicillin, had less inhibitory action on the inflammation of extraction wounds than other cones. With cone B, also containing 5,000 units of penicillin, it took longer for the gingival epithelium to cover the extraction wound completely. With cone C, containing 5 mg. of chlortetracycline hydrochloride, the gingival epithelium propagated rapidly, and the wound was completely sealed in a short period. Granulation tissue in the sockets also grew rapidly. With cone D, containing 5 mg. of oxytetracycline hydrochloride, the extraction wound was soon covered completely with gingival epithelium, the growth of bone was active, and apical infections disappeared. This cone, however, was absorbed more slowly and frequently caused hemorrhagic changes in the extraction wound.

Cone F contained 5,000 units of penicillin, 2 mg. of dihydrostreptomycin and 0.05 mg. of chlorophyllin-copper. Use of this cone frequently caused hemorrhagic changes in the wound. The focus of infection disappeared quickly with this cone, however, as was true when cone E—containing 5 mg. of chlorophyllin-potassium—was used.

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Iontophoresis in root canal treatment

(A propos de l'ionophorèse)

J. P. Friedman. *Inform.dent.,Paris* 38/1:1455-1456 Oct. 18, 1956

Iontophoresis, the method of introducing charged particles into tissues by means of an electric current, can be and should be used in root canal treatment.

The electric current used, however, should be mild. This means it should be below the threshold value of sensibility. After the salts are split up, the electric current carries the ions through the tooth structures and the apical regions.

When a suitable solution, such as trichloroacetic acid, is used, the tissues, transversed by the ionizing current, are exposed to the action of powerful sterilizing agents. These agents, however, are incapable of action during the period in which the current flows. After the current ceases, the ions, which have been introduced into the tissues, attempt to return to their original con-

dition, and, in doing so, form minute quantities of strong acids and alkalis.

Iontophoresis is of considerable value in the treatment of septic root canals. The deep penetration of current-born ions achieves a thoroughness of sterilization which cannot be obtained by the commonly used chemical sterilization methods.

In instances of periapical infection, treatments of full dosage every two days until the flow of pus ceases, and of two more doses at intervals of four days, usually are sufficient to overcome the most stubborn conditions.

The filling of the root canal then can be performed in the usual manner.

In a case reported by the author, a mass found was determined to be a healed granuloma which was converted into scar tissue by the caustic action of iontophoresis. An analogy can be seen between this method of treatment and the healing of tumors with radium or roentgen rays.

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Apicoectomy and immediate root canal treatment

(Die Abdichtung des Wurzelkanals bei der Wurzelspitzenresektion)

Fritz Faber. *Österr.Zschr.Stomat.* 53:359-361 July 1956

In apicoectomy, the immediate root canal filling plays an important part. Amalgam, especially copper amalgam, is commonly used to seal the lumen of the root canal permanently from the apical foramen to the crown of the tooth. Use of this material, however, brings a high degree of uncertainty to endodontic treatment. The proper filling must seal the root canal hermetically, which is not always possible when amalgam fillings are used.

Endodontic treatment may precede or follow apicoectomy. The author recommends that the root canal be filled before surgical removal of the root because undue trauma is then avoided. Pulpless teeth, if adequately treated, may remain in function for an indefinite period without endangering the patient's health.

He also recommends, however, that amalgam be replaced with tin foil (Berten's technic), because a hermetically sealed root filling is extremely important, especially for teeth in which apicoectomy has been performed. In all instances in which tin foil is used as filling material, it is immaterial whether endodontic treatment is done before, during or after apicoectomy.

The advantage of tin-foil fillings consists in the clinically proved fact that a clean, satisfactory root canal filling, even under the most difficult conditions (leaking of crevicular, fibrinous, mucinous, purulent and sanguineous exudates or the development of cysts), is facilitated to a high degree and that the success of the combined treatment (apicoectomy and immediate root canal filling) depends on hermetic closure.

Amalgam fillings seldom are made and inserted under sufficiently sterile conditions, and they, therefore, do not assure a reliable closure.

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The use of ultrasonics in root canal therapy and root resection

Michael J. Richman. *J.D.Med* 12:12-18 Jan. 1957

Use of an ultrasonic dental unit simplifies the mechanical phases of endodontics; namely, opening the pulp canal, cleaning and enlarging the canal, removing the debris, sterilizing and drying, and filling the canal to the apex. The ultrasonic dental unit used in this study consisted of an ultrasonic generator, an air-water-abrasive pumping system, a multicontrol foot switch and the ultrasonic handpiece with interchangeable tips. Of the 50 teeth treated, 32 were anterior teeth, two were bicuspids and six were upper and lower first molars.

With the ultrasonic dental unit the type of motion is such that no rotation of the canal instrument is necessary in opening, enlarging and cleaning out the contents of the canal. The gentle reciprocal massaging action allows the natural vibrational direction of the point to do the job. The nature of the mechanical vibration also produces a forward motion of filling material if it is thin enough to flow. This directional drive beyond the tip of the instrument gradually fills the canal to the apex with a gentle pumping action of the ultrasonic handpiece.

The operator using the ultrasonic handpiece is able to dry the canal without any apparent injury by running the machine at a low power and without a coolant. The degree of dryness obtained is significantly greater than that obtained with a cotton point or with warm air.

The procedure with the ultrasonic handpiece is gentle. The patient is hardly aware of the work. There are no vibrations or jarring, and the cutting action is smooth. With this handpiece the root canal can be entered, enlarged and the entire procedure completed in much less time than that required with the conventional hand instruments. In apicoectomies, in which bone surgery is performed, the bone chisel can be used in a planing fashion, to eliminate the use of a mallet and chisel, malletor or bone bur in opening a window to the apex of the tooth. The type of planing action performed with the ultrasonic bone chisel is gentle and quick. No postoperative complications have been observed.

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Histopathologic and histobacteriologic studies on relation between condition of sterilization of interior of root canal and healing process in periapical tissues in experimentally infected root canal treatment

Munehisa Kitamura. *Bul.Oral Path., Tokyo* 1:1-40 Sept. 1956

Two hundred and fifteen root canals of 13 dogs were infected. The infected root canals were sterilized with either phenol-camphor, eugenol, procaine penicillin in oil or oxytetracycline. The roots were filled with calcium hydroxide and aseptic water paste. Each test group was divided into a 25-day group and a 50-day group, according to the duration of the experiment. As a control, some root canals were left open for from 20 to 83 days. Histologic studies were made, with the following results:

1. When the generally employed methods of sterilization of root canals are used, bacteria always can be found, not only in the apical ramifications, the cementum lacunae and the dentinal tubules but frequently in the principal root canals immediately after sterilization.

2. The sterilizing effect of antiseptics in the root canal is temporary and mostly on the surface. This is especially true of penicillin. Eugenol and oxytetracycline are most effective.

3. As the effect of the antiseptics decreases, bacteria that have remained in the deep portions of the canal begin to proliferate and spread, especially in the principal root canals. It is conceivable that this is the beginning of the so-called "reinfection" of the root canal.

4. A bacterial culture test performed immediately after the completion of the sterilization of the root canal does not represent the real state of infection of the interior of the canal.

5. No known drug when used alone can completely sterilize the interior of root canals.

6. After the application of antiseptics alone, the periapical tissues heal poorly and may be inflamed because of chemical stimulus.

7. Bacteria remaining in the root canal gradually diminish as the inflamed periapical tissues heal.

8. It is essential to use a filling material which promotes the natural healing function.

9. To minimize bacterial infection of the interior and the wall of the root canal, adequate enlargement and cleansing of the canal are necessary.

10. In the treatment of infected root canals, sterilization should be considered a supplementary means of promoting the natural healing of the periapical tissues.

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Chelation in root canal therapy: ethylenediamine tetra-acetic acid for cleansing and widening of root canals

B. Nygaard Östby. *Odont.Tskr.* 65:3-11 Feb. 1957

Agents usually employed for débridement of root canals have little or no dissolving effect on the dentin. The need of an agent which can dissolve dentin to a certain degree is obvious: It would be instrumental in saving time during the treatment and in overcoming otherwise insurmountable difficulties encountered in narrow or obstructed canals. Because hard tissue can be de-

mineralized by organic chelating agents at neutral pH, it was decided to try out a solution of ethylenediaminetetraacetic acid.

The agent has been tried out clinically and histologically with the following results:

1. The compound has a certain dissolving effect on dentin, desirable in all kinds of root canal therapy. It may be applied during débridement of the canal and will reduce the time necessary for this procedure. In narrow or obstructed canals it is of considerable help and may be deposited for some time to soften the dentin. It has been possible to get past fractured instruments in the canal in a short time by means of this solution.

2. A certain amount of the solution will demineralize a certain, distinctly limited, zone of the dentin surrounding the root canal when used during reaming or deposited in the canal. The organic component of the dentin left by this action is easily removed with instruments.

The compound has given no adverse reaction when used routinely and has shown no deleterious effect on pulpal or periapical tissues under the experimental conditions of this study. It is neutral to the gingivae and the mucous membrane and has no corroding effect on the instruments.

Because of the favorable results obtained and because of the results of these experimental investigations, a solution of ethylenediaminetetraacetic acid is recommended to replace inorganic acids in root canal therapy.

A neutral calcium solution (pH 7.3) was used with the following formula: disodium salt of ethylenediaminetetraacetic acid, 17 Gm.; distilled water, 100 ml., and five times normal sodium hydroxide, 9.25 ml.

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Non-surgical management of teeth with periapical pathosis

Ralph F. Sommer. *North-West Den.* 36:1-4, 61 Jan. 1957

Since the majority of radiolucent areas appearing in the periapical region of nonvital teeth have been found on examination of biopsy specimen to be granulomas and granulation tissue, the surgical removal of these lesions actually has meant the removal of defense and repair tissues. When these tissues are allowed to remain intact after successful endodontic treatment, bone repair occurs more quickly. There are many instances, however, in which root resection or apical curettage not only serves a need but becomes the only alternative for the retention of a periapically involved tooth.

The advantages of root resection are as follows:

1. It affords the possibility of completing endodontic treatment in one sitting.

2. Indirect root resection makes it possible to restore a periapically involved tooth carrying a dowel crown, without removing the crown.

3. Teeth with nonvital roots fractured in the apical third can be treated and resected successfully.

4. Root resection affords an effective means of removing broken root canal instruments by way of the resected end.

5. Curved roots, inadvertently perforated because of extreme curvatures, can be resected and restored to normal function.

6. Root resection or apical curettage is indicated in roots with extensive apical resorption.

The advantages of nonsurgical treatment of periapical lesions are as follows:

1. Multirooted teeth with periapical involvement can be treated successfully without the surgical risk of impinging on important anatomic structures.

2. Extensive periapical lesions involving the alveolar crest respond readily to conservative treatment without additional loss of bone.

3. In conservative treatment there is no risk of perforating inadvertently the floor of the nose during the course of apical curettage.

4. Conservative treatment permits bone repair to occur without jeopardizing the vitality of adjacent teeth.

5. Lesions in the upper anterior region frequently extend to and involve the palatal plate of bone. During surgical removal of the granulomatous tissue, a portion of the palatal plate frequently is included, which results in incomplete osteogenesis because of failure of the palatal plate of bone to repair. In conservative treatment the periosteum of the palatal plate of bone remains undisturbed.

Although root resection or apical curettage can serve a useful purpose in some instances, in others the nonsurgical management of periapical lesions is an effective means of reconverting granulation tissue into alveolar bone.

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▼ Periodontics

A review of the epidemiology of periodontal disease

Charles M. Belting. *J.Periodont.* 28:37-45 Jan. 1957

In the epidemiological study of periodontal disease, four methods of measurement have been used: (1) tooth loss; (2) roentgenographic analysis: (3) clinical examination, and (4) roentgenographic analysis correlated with clinical examination.

There is wide variation in the reported prevalence of periodontal diseases due primarily to lack of uniformity in the methods of assessment used, and to inherent differences in the sample population examined.

The reported morbidity rates of periodontal disease reveal two patterns of consistency: (1) the age of onset is between 10 to 15 years, and (2) the peak incidence is reached between 40 to 50 years of age.

The roentgenogram appears to be the most objective tool available at present for epidemiological study. It provides a permanent record which can be analyzed by some type of scale which will eliminate subjective interpretation. Roentgenographic observations, when used according to the methods of analysis so far described, indicate alveolar bone changes in about 12 per cent of patients in which pocket formation does not exist clinically.

Since periodontal disease constitutes a major public health problem, the public health dentist is the logical specialist to conduct further research on its epidemiology. The public health dentist should develop an educational program to stimulate more adequate recognition and treatment of this insidious disease, and he should solicit the cooperation of the American Academy of Periodontology in developing a standardized method of assessment.

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A five year longitudinal study of the gingival condition of a group of children in England

Gilbert J. Parfitt. *J.Periodont.* 28:26-32 Jan. 1957

An index of gingivitis combining a modification of Schour and Massler's PMA index and a severity rating with five arbitrary levels was utilized in a five year study of children between the ages of 2 and 17 years, living in an institution near London. One hundred forty-nine boys and 106 girls were present for from 12 to 60 months; 1,120 examinations were made, each child being examined every six months.

The severity of inflammation on the labial surface of the gingivae in the maxillary incisal region rises from the age of 3 to a peak at 13 years for both sexes. A noticeable decrease then follows until at the age of 17 the score falls to the level reached by the age of six years.

The incidence of gingivitis in the labial surface of the maxillary incisal region reached a peak at the age of 13 or 13½ years in boys, and at the age of 11 years in girls.

The prevalence and severity of gingivitis both rise to a peak at the ages of 11 and 13 years respectively, but thereafter the prevalence falls only slightly, whereas the severity of inflammation falls sharply.

As the greatest incidence of gingivitis in boys and girls occurs at about the same time as the onset of puberty, a hormonal factor may be responsible.

The incidence of gingivitis between the months of December and July varies, but the values for August, September, October and November are slightly lower than for the other months.

School of Dentistry, University of Alabama, Birmingham, Ala.

Basic science

▼

Anthropology

Morphologic examinations of cusps and roots of human teeth

(Höcker und Wurzeln der menschlichen Zähne als komplexe Organe betrachtet)

Siro Taviani. *Deut.zahnärztl.Zschr.* 10:1478-1481 and 11:103 Nov. 15, 1955 and Jan. 15, 1956

Until the second half of this century, morphologists interested in studies of dental tissue structures have assumed that human teeth consist of so-called elementary components, cusps and roots, which by coalescence or fusion have formed the final product: the human tooth.

In dental literature, differences existing between the structures of individual cusps and roots are almost neglected. Only Bolk and Van Loon mentioned the possibility that several components have formed the different parts of the teeth. The first author, however, had examined the structures of upper molars only, and the second author those of lower molars.

Recent research by the author has revealed that cusps and roots of all human teeth are complicated organs which have originated from a union of different components. The dentition of present-day man has descended from a "hexacuspidoradicular" primordial tooth which is diagrammatically represented in Figure 1. In this diagram, the letters A, B, C, D, E and F represent the six cuspidoradicular elements. The molars of modern man are the nearest types to the primordial tooth. The cusp formation of human teeth is presented in the diagrams: Figures 2 and 3 show upper and lower molar; Figure 4, upper and lower bicuspids; Figure 5, cuspids and incisors.

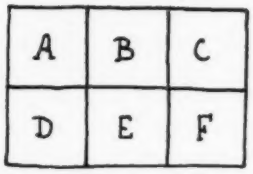

Figure 1 Schematic arrangement of cusps of primordial tooth

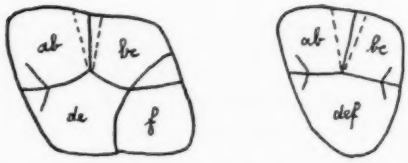

Figure 2 Upper molars. Left: four cusps; right: three cusps

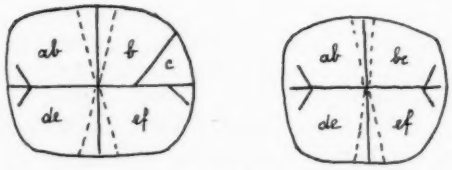

Figure 3 Lower molars. Left: five cusps; right: four cusps

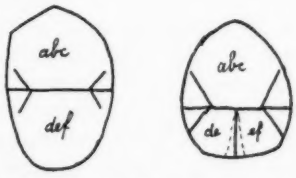

Figure 4 Bicuspids. Left: upper (two cusps); right: lower (three cusps)

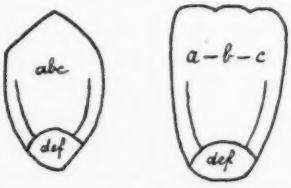

Figure 5 Left: Cuspids. Right: Incisors

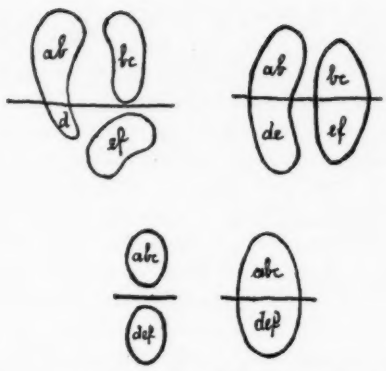

Figure 6 Root formation. Above left: upper molars; above right: lower molars; below left: bicuspids; below right: cuspids or incisors

In the root formation of upper molars (Fig. 6, above left), the connecting line d-a-b is found in mesiobuccal roots; b-c in distobuccal roots and e-f in palatal roots.

In the root formation of lower molars (Fig. 6, above right), the connecting line a-b-d-e is found in mesial roots, and b-c-e-f in distal roots.

In monoradicular teeth, all six root elements are present but fused together; in biradicular teeth, first upper bicuspids, the vestibular grouping is separated from the lingual grouping (Fig. 6, below left and right).

In modern man, the unique form of the teeth probably is caused by an evolutionary narrowing of the jaws during the developmental period of the dental germs. By a simultaneous reduction in numbers of cusps and roots, the mesiodistal width of the teeth, compared with that of the primordial tooth, also is reduced. This specific diminution of cuspidal and radicular connections has caused the development of intracuspidal and intraradicular grooves.

The diagrammatic representation of these evolutionary alterations, however, has only a relative value, because cuspidal and radicular connections present a far more complicated evolutionary process than the simple fusion of two neighboring elements. Compression of substance, decrease in tooth width and evolutionary changes of dental structures must be taken into consideration.

In the diagrammatic representations, it can be observed that in upper molars a division of the central elements from the three vestibular primordial units has taken place. In the lower bicuspids with three cusps, the fusion began at the center of the three lingual elements. In the lower molars the fusion involved both the vestibular and the lingual elements. A similar fusion has taken place in the root development in upper molars.

A further differential development (or better, redevelopment) of four or more independent root branches, already observed in a few unique instances, must be considered as possible.

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Caries frequency in Greece from prehistoric periods to modern times

(Die Kariesfrequenz in Griechenland von der Vorgeschichte bis zur Neuzeit)

Georg Dascoulis. *Deut.zahnärztl.Zschr.* 11:1470 Dec. 15, 1956

In the evaluation of excavated skulls from prehistoric and early historic periods, differences in opinions and conclusions occur frequently.

These skull remains consist often of a comparatively insignificant number of poorly preserved bones and teeth. Statistics on caries frequency in prehistoric man, which usually are based only on percentages, are bound to be erroneous.

The skulls exhibited in Greek museums came from several places, and, therefore, from regions in which the inhabitants had (and still have) different habits and conditions of life.

Recently, macroscopic and roentgenographic studies were made of 343 excavated skulls from different periods.

In skulls from the Paleolithic, Eolithic and Neolithic periods, only a maximal abrasion but no signs of dental caries were observed. In 186 teeth from the Bronze Age, caries was not found. Loss of teeth in these fossil jaws, although frequently observed, probably was not caused by caries but by trauma, excessive abrasion or by postmortem circumstances.

Historically, the first sign of caries was observed in skulls excavated on the site of Troy from the Minoan and Mycenaean periods (2,000 B.C.). In 528 teeth from these skulls, 12 cavities were

found, mainly in bicuspids and molars. In all instances it was proximal caries. Some of the first molars showed severe abrasion.

In about 2,000 teeth of skulls traced back to Sparta of the seventh century B.C., 41 carious teeth were found. Also here, bicuspids and molars were mainly involved. Excessive abrasion was present in teeth of older persons only.

In the period of classical Greece, the caries frequency increased. More bicuspids than molars showed carious defects.

In skulls from the Middle Ages, caries not only occurred more frequently but it appeared also in anterior teeth and progressed to deep cavities that reached the pulp. In many instances, horizontally dislocated third molars were found.

Caries in cuspids was found for the first time in the teeth of skulls from about 1,500 A.D.

After this period, caries frequency appeared to be almost identical with that in present-day Greece.

In 1936, Krikos found caries in 27 per cent of the teeth examined (and in 48 per cent of persons). Later examinations established a far higher percentage, that is, in about 70 per cent of the teeth and 80 per cent of patients.

Oral hygiene in present-day Greece is practiced by only 40 per cent of the population.

Periodontal disease was found in only 5 per cent of children, in 15 per cent of middle-aged persons, but in 25 per cent of the older age group.

Hippokraton 34, Athens, Greece

▼ Physics

Some effects of coolants on the mechanism of cutting with dental burs

T. J. Rigas, E. W. Skinner, R. S. Lindenmyer and R. L. Lasater. *Internat.A.D.Res.Preprinted Abst.* 108 March 21, 1957

The effects of air and water streams and an air-water spray during the cutting of ivory, glass and bovine enamel were observed and contrasted with the effects of dry cutting. For each rotational speed, a definite load (called the "cutoff load") exists below which the cutting rate decreases rapidly with continuous cutting. This load depends on the type of coolant and cutter used, the rotational speed and the material cut.

A theory is advanced for the mechanism of cutting, which relates the cutoff load and the design of the tool to the elastic properties and impact resistance of the material cut. The less the rate of relaxation and impact resistance of the material, the lower is the cutoff load for a given rotational speed. Experimental results can be explained by such a theory, and it should form a basis for future dental tool designs and selection of proper loads and rotational speeds.

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▼ Psychology

Xerostomia and bruxism

Harry Roth and Herbert F. Spasser. *New York J.Den.* 28:9-11 Jan. 1957

A 43 year old unmarried woman complained of dryness of the mouth on awakening. The condition had been noted 18 months earlier. The dryness was not manifest during waking hours. The patient was referred to the Department of Periodontia and Oral Medicine of New York University College of Dentistry. Her condition was diagnosed as xerostomia, or dry mouth, a condition of obscure etiology characterized by decreased secretion of the salivary glands. Bruxism was present at night.

A thorough clinical examination, careful questioning and analysis and a thorough physical examination showed the patient to be in good health and precluded any organic abnormalities which could account for the patient's complaints.

Because of emotional disturbances, the patient had been under psychiatric care for the past year. Placebo capsules were given to the patient for four weeks. The oral symptoms subsided and did not recur. She felt that the placebo capsules were responsible for the disappearance of the symptoms. Correspondence with her psychiatrist re-

vealed that she showed a considerable diminution of anxiety.

Many dental patients may be emotionally disturbed and in need of understanding, sympathy and advice concerning their oral disturbances. This patient was benefited by consultation, advice, reassurance and placebo administration. Psychiatric aid in conjunction with good rapport between patient and dentist was of inestimable value in treating this patient.

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▼

Anatomy

The morphology of tooth receptors
(Morfologija retseptorov zuba)

L. I. Falin. *Stomat., Moscow* 6:7-20 Nov.-Dec. 1956

The problem concerning dental innervation has received attention for a long time. What makes the dentin sensitive is still a subject of discussion. Disagreement exists regarding the nerves in the dental pulp, and there are little data available on the innervation of the periodontal membrane.

In the Medicostomatologic Institute of Moscow research was undertaken on this subject. Material was obtained from adult human cadavers. Blocks of teeth with parts of mandibular and maxillary bones were removed from the jaws and fixed in 20 per cent Formalin. After decalcification in nitric acid, sections were cut and stained by silver impregnation after the method of Bielschowsky-Gross, and by hematoxylin or carmine.

The findings showed that the periodontal membrane contains multiple nerve receptors, distributed more widely in the region of the root apex. The nerve, after entering the periodontium at the bottom of the alveolus, under the apex, or from the side walls of the alveolus, divides into branches which form their endings or receptors between the elements of the connective tissue.

Two different types of free nerve endings were found: (1) arborized with branches ending in little knots consisting of thin, rather long threads twisted around an inner core, and (2) bulbous endings of single or paired nerve fibers which interlace in a loose network. No encapsulated nerve endings were discovered in the periodontium of human teeth.

As a rule, the arborized endings were parallel to the bundles of collagen fibers, apparently belonging to the mechanicoreceptors signalizing to the central nervous system the pressure developed during mastication. The less numerous bulbous endings were lying in a perpendicular direction to the collagen fibers or between them.

Although seldom observed and often absent in the periodontium of certain teeth, bulbous endings were always found in the periodontium of incisors. Probably they are related with the touch sensation, as the incisors determine the physical qualities of food, first of all its hardness.

The variety of forms of the nerve endings show that they respond not only to tactile irritation and masticatory pressure but are also concerned with the pain sensation. The periodontal membrane with its multiple sensatory nerve endings presents a vast reflexogenic region and is in accordance with specialized nerve endings in other parts of the body.

Further investigations showed that the pulp has its own receptors. Most of them are associated with the odontoblastic layer and dentin. Others are related to the vessels and the connective tissue of the pulp itself. All of them belong to the arborized type with their branches distributed in different directions. Located in the subodontoblastic layer of pulp or at the margin of it, they often are mistaken for the plexus of Raschkow. In some instances the terminal branches form the so-called "polivalent receptors" by ending in both the connective tissue and the vessels.

The medullated nerve fibers entering the pulp cavity through the apical foramen divide dichotomously into branches with endings passing through the odontoblastic layer in the predentin. The nonmedullated nerve endings, after entering the predentin, turn in a parallel direction to the odontoblasts and divide in two parts. One part curves back to the odontoblasts and another ends in the predentin.

The root of the teeth was found less innervated. The plexus of Raschkow, usually well developed in the pulp of crown, was absent. No nerve fibers were observed in the predentin of root walls.

From the predentin the nerve fibers proceed into the dental tubuli. It was not possible to trace where they end and how deeply they penetrate the osseous dentin. There was no evidence of the innervation of dentin, and the proof of it requires further investigation.

The problem of the innervation of dental pulp is closely related to the nerve cells in the pulp. The slides of the subodontoblastic layer showed sharply defined starlike cells from which multiple thin and very long filaments, interlacing in a close net, extended. In some instances triangular or polygonal-shaped protoplasmic expansions were observed, ending in short tiny branches. These multipolar cells, resembling nerve cells in shape, were found not to be nerve cells because they lacked the characteristic fibrils.

There is no evidence that the dental pulp contains nerve cells and the innervation of pulp and the inner part of dentin occurs by nerve fibers entering the tooth through the apical foramen.

Medicostomatologic Institute, Moscow, U.S.S.R.

The deciduous dentition: a descriptive and comparative anatomical study

Knud Dreyer Jørgensen. *Acta odont.scandinav.* 14, Suppl.20:1-202 1956

The possible racial and evolutionary significance of anatomic structures in the deciduous dentition of Danish children was studied. The material comprised 1,298 teeth of medieval Danes and 6,313 extracted deciduous teeth of modern Danes. The medieval material was well preserved, whereas some of the modern teeth were badly damaged by caries, attrition and resorption. The principal descriptive results appear in 41 tables.

No general conclusions were reached with regard to the racial and evolutionary status of the material, since the present work is the first extensive odontographic study of recent deciduous teeth, and because sufficient fossil material is not available.

The conclusions are confined to (1) a survey of supposed conservative and progressive structural features of the individual teeth, (2) a list of the structural elements of unknown racial and phylogenetic value and (3) a list of some facts of interest for phylogenetic studies of the anatomy of deciduous teeth.

The author pleads for an extended international cooperation in the study of comparative human odontography, a branch of science still in its initial stage. The chief obstacles to progress in this field of research are: lack of reproducible definitions of the individual morphologic structures and their degrees of development; lack of comparative material, and incomplete knowledge of the relation between the heritable character and the anatomy of man's extinct ancestors.

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Progress review: anatomy

Melvin L. Moss. *New York D.J.* 23:14-15 Jan. 1957

Of 406 papers and demonstrations presented before the 1956 annual meeting of the American Association of Anatomists, nine dealt with topics of interest to dentistry.

A study by Richney on the osteogenesis of the human mandible seems to settle the question of Meckel's cartilage. It appears that the anterior portion of this structure ossifies and is incorporated into the anterior portion of the lower bony ramus. The formation of the coronoid and condyloid processes is exactly described.

Flanagan and Meyers, discussing the effect of homotransplantation of teeth, report indications of tissue incompatibility detrimental to such procedures.

Domm and Leroy show that if a pregnant rodent receives cortisone at various times before giving birth, there is created an accelerative effect on the eruption of the teeth in the offspring. Bixler and others report that the same drug in the same form has no appreciable direct effect on submaxillary gland form and structure.

Reith, in an experiment with rats on the origin of dental pigments, suggests that the destruction of red blood cells releases a pigment derivative, hemosiderin, which is then passed on to the ameloblasts. Although this theory necessitates the

presence of phagocytic cells in the lining of sinusoids in the dental papilla, the demonstration of these cells is not complete.

Waterman and others presented a preliminary report on the effect of a vitamin D-free diet on the mandibular condyle.

Three other papers dealt with the development of cranial structures. Helff reported that the tongue of amphibia is not regionally irrevocably determined at all stages and that it possesses considerable powers of regeneration after partial extirpations. Deuschle and Warkany noted congenital mandibular, palatal and nasal defects in rats born of mothers whose diets were deficient in riboflavin. Moss reported on the quantitative and qualitative alterations between the cranial components of the rat during growth.

Anatomy departments in the United States do not show much interest in specific dental problems, unlike many anatomy departments abroad which are deeply committed to the investigation of dental topics.

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▼

Biology

Genetic effects of iontophoresis in man

(Die Wirkung ionisierender Strahlen auf die Erbanlage der Menschen)

G. G. Wendt. *Deut.med.Wschr.* 81:1397-1400 Aug. 31, 1956

Quantitative and qualitative data on possible harmful genetic effects of iontophoresis are incomplete. Iontophoresis, recently used in different branches of medicine and dentistry as ionic medication, because of "artificially" produced mutations, has already doubled the rate of spontaneous mutations in members of the highly civilized races.

Such an increase in spontaneous mutation, however, leads inevitably to an increase in diseases and to a decrease in resistance to disease in future generations.

These consequences of iontophoresis will lead to an even greater number of genetically handicapped persons than exist today, to be supported entirely or partially by the healthy members of their communities.

Considering the probability that such harmful genetic effects can be caused by iontophoresis, a serious sociologic problem arises which calls for immediate measures by members of the branches of medicine and dentistry in which iontophoresis is used.

Robert Koch Strasse 6, Marburg/Lahn, Germany

Dental calcification in intrauterine life: contribution to study

(Contribución al estudio de la calcificación dentaria en la vida intrauterina)

I. Sáenz de la Calzada. *An.españ.odontoestomat.* 15:427-446 June 1956

It was previously determined by microphotographic studies on human embryos that the early outline of the dental germs appears somewhere around the fortieth day of intrauterine life. Chronologic roentgenographic studies on the calcification of the teeth in intrauterine life were carried out in fetuses of all ages.

It was observed that dental calcification starts at about the fourth month of intrauterine life. Calcification occurs earlier in lower than in upper teeth but on the same date for both the right and left sides, first in the mandible and then in the maxilla. A graphic chronologic scheme of dental calcification shows the regions of calcification of dental crowns in the various ages of the fetuses. Calcification of the deciduous teeth occurs in the central incisors (more severe in the lower than in the upper ones) in fetuses 16 weeks old; in the crowns of incisors, cuspids and molars in fetuses 22 weeks old; and in the crowns of all deciduous teeth in fetuses 28 weeks old.

Calcification in the crowns of fetuses 28 weeks old was pronounced in the periphery and scarce in the center of the crowns. Calcification of permanent teeth started only on the cusps of the first molars in fetuses 32 weeks old. This study showed that only the crowns (or a part thereof) of all the deciduous teeth and the tubercles of the first permanent molars become calcified during the intrauterine life. Cementification of all the deciduous

teeth and calcification of all permanent teeth (with the exception of the tubercles of the first permanent molars in which it occurs during fetal life) take place after birth.

Madrid, Spain

▼ Physiology

Talking about saliva

A. C. Kerr. *D.Practitioner* 7:30-35 Oct. 1956

The functions of saliva are twofold:

1. Alimentary. Saliva makes tasting possible, and without it chewing or swallowing would be difficult.

2. Protective. Saliva provides lubrication, physical cleaning, chemical buffering and antibacterial activity.

The amount of saliva that can be collected from a mouth depends on the amount of stimulation which is applied to the mouth. With subjects sitting quietly in the laboratory, a basal flow of saliva ranges, among subjects, from 0.02 to 1.1 ml. per minute. If various things are put in the subjects' mouths, the outflow of saliva increases. The ratios of the mean output during stimulation to the mean basal output are roughly 10:1 for citric acid, 7:1 for sodium chloride, 4:1 for wax, and 3.5:1 for sucrose.

Four different types of glands secrete into the oral cavity. Schneyer and Levin (1955) found that under resting conditions the submaxillary glands contribute about 70 per cent, the parotid glands 25 per cent, and the sublingual glands 5 per cent of the fraction total of secretion. With moderate chemical stimulation the parotid contribution rises to 34 per cent, the submaxillary drops to 63 per cent, and the sublingual drops to 3 per cent. Since the compositions of the saliva fractions are different, the composition of whole saliva will depend on the size of each of the different fractions.

Hildes and Ferguson (1955) found that the sodium and chloride concentrations of parotid secretion rose with increasing flow rates to values approaching the plasma concentrations of these ions. Potassium remained constant at about six times the plasma concentration and phosphate declined slightly to begin with, then reached at maximal flow rates a value roughly three times that of the plasma concentration. If saliva is to be analyzed, it is important that the methods by which the samples are obtained should be standardized and recorded. If this is done, salivary analyses should provide reasonably repeatable and reliable indices for biochemical studies.

The nature of salivary calculus can be studied clinically, histologically, chemically, physically and microbiologically. Clinical and histologic studies show that rough surfaces and backwaters predispose to calculus formation, and that the calculus matrix is composed predominantly of the bodies of microorganisms. Studies in germfree animals should soon provide the definitive answer to the question whether microorganisms are essential for calculus formation. The physical tool of greatest use in the examination of the structure of calculus is the roentgen ray.

The author's guess is that calculus precipitation is a process of living calcification. The metabolic activity of the microorganisms present in the plaque produces microenvironments favorable to the assembly of the calcium, phosphate, hydroxyl and carbonate ions in a lattice structure.

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Tissue reaction around acrylic root tips

Jens Waerhaug. *J.D.Res.* 36:27-38 Feb. 1957

This study is a link in a series of experiments carried out to determine whether there is any basic difference between the adaptation of the epithelium to inert foreign materials and the adaptation of the "epithelial attachment" to natural teeth.

Acrylic root tips fixed to bridges were inserted in the sockets of 13 teeth in four dogs and 10 teeth in four monkeys. Histologic observation after from 19 to 338 days revealed that the acrylic root tips were well tolerated by the soft tissue. In the majority of instances, the epithelium adhered as closely to the root tip as the epithelial cuff to a natural tooth. No inflammation was observed. In some instances the root tips were

covered by bacterial plaque that caused more or less severe inflammation. A membrane similar to the "primary cuticle" was observed on the surface of the epithelial cuff around the acrylic root tips.

There seems to be no basic difference between the pocket around an acrylic root tip and the pocket around a natural tooth. After an acrylic root tip has been inserted, the alveolar bone will be resorbed or rebuilt to a distance of from 0.3 to 0.9 mm. from the root tip.

Acrylic root tips should not be made too long because too wide a rim of soft tissue without bony support may not be kept in sufficiently close contact with the tooth, thus allowing bacteria and foreign bodies to be pressed into the pocket. Long acrylic root tips should not be placed too near to abutment teeth, because the height of the interdental septum may thereby be reduced. The root under a pontic should be removed completely, as it probably will cause severe inflammation.

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▼ Histology

Electron microscopic investigation of initial caries of the enamel

(Elektronmikroskopische Untersuchungen bei beginnender Schmelzkaries)

Hans Lenz. *Zahnärztl.Rundschau* 65:285-289 June 20, 1956

At the Biologic Institute of the Technical College in Berlin-Charlottenburg and at the Institute for Caries Research of the University of Mainz, electron microscopic investigation of the changes in the enamel that occur in initial caries has been carried out.

The research method employed permitted the evaluation of the principal quantities of anorganic crystalline substances without the customary chemical preparation such as artificial decalcification, complement fixation or mechanical polishing prior to the study.

Under the electron microscope, it was observed that in initial caries the enamel-dissolving substances invade the interior of enamel rods and attack the inorganic structures. This invasion results in a loosening of the previously firm formation of the prismatic columns which compose the enamel.

The progressive and molecular disintegration of the enamel by lactic and pyruvic acids produced by an enzymic action of the oral flora on carbohydrates was studied also. It was observed that the destruction or decomposition of the enamel in initial caries was on a larger scale than previously assumed. In several places there was recrystallization of the previously acicular enamel crystals into rhomboid crystals.

In caries of the dentin, a similar recrystallization occurs in the region of the canaliculi of the odontoblasts, especially in their long threadlike processes.

The direct action of invading bacteria during the initial stage of caries was not determinable, because under the electron microscope no bacterial invasion was ascertained.

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Topical histochemical examinations of tooth organs: the effect of alkaline and acid phosphatases and of reducing compounds on the mineralization of tooth substances, resorption of deciduous teeth and dental caries

(Histotopochemische Untersuchungen am Zahnorgan: Die Wirkung alkalischer und saurer Phosphatasen und das Vorkommen reduzierender Verbindungen bei der Mineralisation der Zahnsubstanzen, bei der Milchzahnresorption und der Zahnkaries)

Rudolf Neujoks. *Deut.Zahn Mund Kieferhk.* 24:265-312 July-Oct. 1956

At the Dental Clinic of the University of Hamburg, Germany, topical histochemical examinations of the tooth organs have been carried out in order to study the effect of alkaline and acid phosphatases and of reducing chemical compounds on the mineralization of tooth substances, resorption of deciduous teeth and dental caries.

In these tests, alkaline phosphatase, acid phosphatase, sulfhydryl and ascorbic acid were used.

A relation exists between the effect of these chemicals and processes of activation in the enzymic system. The most significant influence was exerted by the catheptic enzymes: bromelin, cathepsin and papain.

A parallel exists between the symptoms occurring during the resorption of deciduous teeth and those appearing in caries. These symptoms, however, are in direct contrast to the phenomena observable during the mineralization process in tooth structures.

The material examined consisted of the following: (1) healthy human teeth; (2) carious human teeth, and (3) various parts of the jaws dissected from animals such as dogs, cats, rats, guinea pigs and golden hamsters.

The topical histochemical technics used have proved valuable in obtaining new knowledge in the field of dental research, especially caries research.

Martinstrasse 52, Hamburg 20, Germany

▼ Miscellaneous

Gerontology and dentistry

(La gérontologie en odonto-stomatologie)

J. Cecconi. *Méd & Hyg.* 40:326-327
April 30, 1956

Gerontology, the scientific study of the phenomena of the aging process and its syndromic pathology, now is taught in many universities and colleges. Gerontology was first introduced into the curriculum of medical students at St. Louis, Mo. and at Liège, Belgium.

At these colleges, three different courses are given: (1) biologic; (2) pathologic, and (3) public health gerontology. The exact demarcation between these topics, however, was difficult to establish. Present-day science has not been able to differentiate clearly between biologic and pathologic age. Some persons, more than 70 years old, look, feel and act young, and others, hardly 40 years old, appear and behave senile.

The life expectancy is increasing steadily, and this has produced new problems for medicine and dentistry.

The increase in the number of aged patients in daily dental practice has not been paralleled by the expected increase in edentulous mouths. In prosthetic dentistry, partial dentures have become the restoration of choice by dentists and patients.

The preservation of both lower bicuspids should be attempted whenever possible. The upper bicuspids, however, are "weak links" in prosthetic procedures. The stress of masticatory forces often causes fractures in these teeth; therefore, the first and second molars are preferred as abutment teeth for partial dentures.

Treatment methods to be used in aged patients do not differ greatly from those in other persons. In aged patients, however, tilting and turning of teeth occur more frequently, and weakening of the alveolar bones should be considered in treatment planning. It often will be necessary to insert a crown on a remaining tooth in an aged patient before the tooth can be utilized as an abutment. When the enamel and dentin of the tooth show signs of changes, endodontic treatment should be given. Conservative procedures often are contraindicated because of the hypersensitivity of the abraded tooth. This type of hypersensitivity is different from that dentists often encounter in daily practice. Every dental intervention in aged patients requires great experience and knowledge because pulp injuries occur more frequently.

In addition, there exists a relationship between general health and dental condition which is distinctly noticeable in aged patients. Older patients afflicted with cardiopathies usually take glyceryl trinitrate tablets which cause brittleness of all teeth. These teeth should be covered with crowns.

Asthma, tuberculosis, rheumatism and many other diseases are more frequent in aged persons, and psychic and mental conditions often produce problems for the dentist which are more difficult to solve than those in younger persons.

15, Boulevard des Philosophes, Geneva, Switzerland

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Pathology

Facial furuncles and their treatment
(Der Gesichtsfurunkel und seine Behandlung)

Hartwig Eufinger. *Med.Klin.* 51:1868-1869 Nov. 2, 1956

Facial furuncles, usually appearing on upper lips, are similar to nodules occurring in folliculitis, but the boils are more deeply seated, accompanied by perifollicular suppurative inflammation and tend to become abscesses.

The cutaneous furuncle, usually only a few millimeters in size, is the result of infection of a hair follicle or of ducts of the cutaneous glands caused by pyogenic bacteria such as *Micrococcus pyogenes* var. *aureus*.

Furuncles of the chin frequently are accompanied by osteomyelitis.

Before treatment of facial furuncles is contemplated, it should be remembered that every mechanical irritation such as the action of facial muscles during speech function or that of oral muscles during masticatory function may aggravate the condition by spreading the infection.

Unconditional suppression of speech and of the masticatory function by liquid diet are essential for the appropriate treatment.

Serious mechanical irritations are produced by surgical openings of facial furuncles; such a procedure often is unnecessary and dangerous. The walls, formed by the defense mechanism of the body, are easily ruptured, and vein trunks and lymph tracts are interrupted.

The statistical data on surgical openings of facial furuncles performed at the Surgical Clinic of the University of Kiel, Germany, revealed a mortality rate of 25.9 per cent. After surgical treatment was discontinued, the mortality rate decreased to 9 per cent.

Local treatment is recommended, such as with ichthammol and thiosulfate ointment dressings, and short wave, infrared and roentgen irradiations.

Antibiotic treatment in 170 patients with facial furuncles, among them 80 with furuncles of the lips, obtained complete cures, and there were no fatalities.

The success of antibiotic treatment, however, should not influence physicians or dentists to regard facial furuncles as a pathologic condition which can be cured easily.

Weimarer Strasse 8, Kiel-Wik, Germany

Foreign body granuloma of the tongue caused by an embedded deciduous tooth: report of case
(Milchzahn als Ursache eines Fremdkörpergranuloms)

W. Kappesser. *München.med.Wschr.* 98:1777-1778 Dec. 28, 1956

The patient, a 15 year old boy, had a slow-growing granulomatous lesion of the tongue. Aside from tenderness during mastication, there were no subjective complaints.

Clinical examination revealed a tumor consisting of granulation tissue, the shape and color of a cherry, at the anterior third of the tongue. The neoplasm was surrounded by a region of inflammation rich in eosinophils. The mucous membrane of the other parts of the tongue and of the oral cavity showed no abnormal symptoms.

In differential diagnosis, a cystic fibroma or a fibrosarcoma was considered.

During an exploratory puncture of the granuloma, the needle met the resistance of a compact foreign body.

A soft tissue roentgenogram of the tongue revealed a tooth-shaped formation that was indicated by a black shadow.

The foreign body and the surrounding granulation tissue were excised. The removed tissue showed proliferation of the epithelium which seemed to be progressing in depth.

The foreign body was a well-preserved deciduous incisor, which, according to the patient's mother, had become embedded in the tongue after an accidental fall when the boy was four years old.

This embedded deciduous incisor, unquestionably, was the cause of the foreign body granuloma which developed 11 years after the accident.

Ludwig-Rehn-Strasse 14, Frankfurt am Main, Germany

Preventive and public health dentistry

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Caries etiology and control

Effect of certain restorative materials on solubility of enamel

Ralph W. Phillips and Marjorie L. Swartz. *J.A.D.A.* 54:623-636 May 1957

An investigation was undertaken: (1) to determine whether silicate cement and certain other common restorative dental materials influence the solubility of enamel, and (2) if such a mechanism was evidenced, to determine whether fluoride compounds might be added to materials which have no antibacterial properties in order to reduce enamel solubility and thereby protect better the critical marginal regions against recurrent caries.

Both powdered enamel and intact tooth surfaces were employed, and the solubility determined by means of calcium and phosphorus measurements after treatment of the enamel with acetic acid. Analysis of results obtained on over 600 individual specimens and 2,000 chemical analyses led to the following conclusions:

1. Commercial silicate restorative materials produce a considerable reduction in enamel solubility. This reduction may be attributed to the fluoride present in the silicate.

2. It is probable that the lower incidence of recurrent caries generally found around the silicate restoration can be attributed, to a great extent, to this increased resistance of the surrounding tooth structure to acid attack.

3. The rate of reaction of the fluoride in the silicate with the intact enamel is fairly rapid, being measurable at five hours and apparently reaching a maximum at the end of two weeks.

4. All the materials which contained no willfully added fluorides—resin, zinc phosphate cement and silicate—actually increased the solubility of the intact enamel surface.

5. Experimental resins containing added amounts of either sodium fluoride or stannous fluoride, zinc phosphate cement containing calcium fluoride and one commercially available resin containing both sodium fluoride and stannous fluoride, reduced enamel solubility to varying degrees.

Although much chemical and histological research must be completed before a fluoride-containing material could be recommended for dental use, the mechanism which has been proved opens a promising field for the development of certain materials that could offer definite protection against recurrent caries.

This prize-winning essay was presented before the 1957 midwinter meeting of the Chicago Dental Society.

Indiana University School of Dentistry, 1121 West Michigan Street, Indianapolis, Ind.

A factor influencing the distribution of carious lesions on tooth surfaces

W. S. Neill. *Australian D.J.* 1:269-272 Oct. 1956

An important factor in the development of caries, especially in young teeth, is related to the gingival margin. White lines form on the teeth along the gingival margin, and they erupt with the teeth. These white lines are a weakness, and cavities form more easily where the lines are.

The white lines may be continuous around the tooth, or they may extend along only part of the tooth's circumference. Often a series of such lines, one above the other, may affect an area of the tooth. Such areas have been among those noted previously by others as "white spots." All these white lines, both those occurring singly and those forming an area, have one thing in common—at one time they were related to the gingival margin.

The white lines are prone to subsequent extension of the carious process, during which there is usually darkening of the lines. They form the starting place for the majority of the smooth-surface cavities above the bulge of the tooth. In children, the white lines seem to account for most of the proximal cavities.

The assertion that the white lines predispose to, or determine, the occurrence of proximal

caries does not conflict with the theory of a caries-producing influence related to the proximal area, for the latter influence supplements the former. The white line provides the flaw by which subsequent caries-producing factors may more readily form a cavity. In the absence of white lines, the interproximal factors produce lesions much more slowly.

White lines seem to form most readily on teeth which are erupting fairly rapidly. Lines tend to form on several teeth at the same time. That the white lines form less readily some time after the teeth have erupted seems to show that a change is taking place in the enamel. This may be related to fluoride.

The distribution of the white lines indicates the chronology of the caries experience. For instance, if there is a definite area of normal enamel between the white lines and the gingival margin, then even a large number of cavities represents a former rather than a current caries activity. On the other hand, extensive white line formation along the whole gingival margin forecasts likely further caries.

130 Queen Street, Brisbane, Australia

Topical application of stannous fluoride

Joseph C. Muhler. *J.A.D.A.* 54:352-353
March 1957

The clinical effectiveness of stannous fluoride depends on the prevention of oxidation of the stannous tin to the stannic state. To assure that the solutions of stannous fluoride for topical application have a high percentage of the tin in the stannous form, the solutions must be prepared fresh and be used immediately. This is most conveniently done by having a pharmacist weigh 0.40 Gm. of solid stannous fluoride into a Lilly no. 0 gelatin capsule. The filled capsules containing the solid stannous fluoride should be kept in a container which can be sealed tightly after the removal of individual capsules.

Immediately before use, the contents of a single capsule are added to 10.0 ml. of distilled water and shaken briefly. After the contents have completely dissolved, the solution is applied immediately to the teeth. The 10 ml. of solution should be sufficient to treat all teeth of a single patient. If any of the solution remains, it should be discarded.

It is convenient to have a 25 ml. graduated cylinder for measuring the distilled water and a 25 ml. polyethylene bottle in which to mix the solution. The solution is easily mixed by stirring it with the cotton-free end of the wooden cotton applicator which will subsequently be used to apply the solution to the teeth. No flavoring or coloring agent should be added to the solution.

A prophylaxis, not a toothbrushing, should precede the initial treatment.

Immediately after the prophylaxis, the first treatment is applied. One quadrant of the mouth is isolated with cotton rolls. The teeth must be kept absolutely dry during treatment. After the teeth are isolated, they are dried with air, and the stannous fluoride solution is applied with a cotton applicator. The teeth are kept moist with the stannous fluoride solution throughout a four minute period by repeatedly moistening the teeth with the solution. After the treatment of one quadrant, the remaining teeth are treated in the same manner and the patient is dismissed.

The topical application is repeated for three additional treatments in the same manner, except that only the first is preceded by prophylaxis. The four series of applications should be completed within a 10 to 14 day period. The four series of treatments can be started when the child is three years old. After the age of six, however, it might be well to repeat the treatments every two years.

Indiana University, Bloomington, Ind.

Caries prevention: wine and fluoride

(Prophylaxie de la carie: fluor et vin)

Ch. Ray. *Ann.odontostomat., Lyon* 13:199-203
Sept.-Oct. 1956

The frequently observed resistance to caries in persons who consume wine regularly seems to justify the assumption that many varieties of wine contain fluoride.

A recent examination of Swiss wines revealed that wines originating from the western parts of Switzerland contain a large variety of acids and other substances, either of vegetal or mineral origin, among them fluoride of from 0.6 to 5.5 ppm. Some of these substances were present in

the original grape juice; they had passed from the soil of the vineyards into the grapes and from the grapes into the wine, without being affected by the fermentation process.

Fine natural wines have ingredients which influence favorably the formation and flow of saliva. In habitual wine drinkers, the anterior teeth, especially the cuspids which are extremely resistant to caries, are constantly bathed in a flow of saliva.

The consumption of wine also stimulates the appetite, thereby increasing the secretion of gastric juice rich in pepsin.

A dose of alcohol (such as is present in a bottle of wine) exerts no unfavorable influence on the performance of muscular activity but it acts as an antispetic which is, in the oral cavity, at least, as effective for the control of minor infection as the tooth pastes which have been promoted with exaggerated claims for antienzyme and antibacterial activities.

18, Grande Avenue, Sierre, Switzerland

Dental caries produced in the vervet monkey (a preliminary report)

T. Ockerse and C. L. de Jager. *Brit.D.J.* 102:93-96 Feb. 5, 1957

The vervet monkey, *Cercopithecus aethiops*, appears to be a suitable experimental animal for dental caries research because its dental structures closely resemble those of man. Its dentitions are diphyodont, its teeth heterodont and it has the same dental formula. The incidence of dental caries in the vervet monkey in its natural habitat is extremely low. Of 2,700 monkeys examined, only 20 showed any signs of dental caries, these having 37 cavities, mostly small ones.

The vervet monkeys were divided into four groups each consisting of 14 animals and their teeth examined for caries. Group I was fed a diet of maize meal porridge with sugar, white bread on which a syrupy glucose solution was spread, bananas, oranges, tomatoes, raisins, glucose sweets, hard sticky toffees and sweet biscuits. Group II was fed the same diet with 10 ppm fluoride in the drinking water. Group III was fed brown bread, raw carrots, raw sweet potatoes, bananas, oranges, tomatoes, shelled raw peanuts and boiled eggs. Group IV received the same diet as group III with 10 ppm fluoride in the drinking water. Only two monkeys in the four groups suffered from caries when the experiment commenced in October 1953. All the monkeys have been examined for caries every six months since 1953. When it was found that some of the monkeys in the cariogenic diet group (groups I and II) developed caries, the pH of the tooth surfaces, saliva and carious lesions was determined every six months from October 1954 to March 1956.

The eight monkeys in group I that survived to March 1956 had a total of 21 cavities; the eight that survived in group II, 18 cavities; the nine in group III, 1 cavity, and the five in group IV, 2 cavities. One monkey in group II and one in group IV had caries at the beginning of the experiment.

The average pH of all tooth surfaces was 7.8 and of the saliva, 8.3. The average pH of the tooth surfaces of 26 monkeys recorded soon after they were captured and not under an anesthetic was 7.5 and that of the saliva, 7.8.

The modern diet, as one of the main etiologic factors of caries in humans, apparently also produces dental caries in vervet monkeys. The preliminary findings point to the assumption that in the vervet monkey caries may develop in an alkaline environment. The question arises whether past and present investigators were concerned with only one type of dental caries. Could caries be a complex of diseases with apparent similar clinical manifestations but different etiologic factors and pathogenesis? Further investigations to clarify this problem are being carried out.

Union Health Department, Pretoria, South Africa

Fluorspar for fluoridation

Franz J. Maier and Ervin Bellack. *J.Am.Water Works A.* 49:34-40 Jan. 1957

The principal item of cost in fluoridating public water supplies is that of the chemicals. If the cost of chemicals were reduced, the fluoridation procedure would be even less expensive than it is at present. The greatest reduction of such costs can be achieved by using fluorspar, the cheapest of all commercial fluorides. The least costly

fluoride compound now being used for fluoridation, sodium silicofluoride, costs three times as much as fluorspar.

There is substantial commercial production of fluorspar in Argentina, Australia, Canada, China, Korea, England, France, Germany, Italy, Mexico, Newfoundland, Russia, Spain, Tunisia, Union of South Africa and the United States.

A device which permits the use of fluorspar in fluoridating water has been developed by the authors. Previously, fluorspar was deemed impractical for use in water supplies because it does not dissolve readily. When this compound is used in the tanklike dissolver, however, an alum solution is fed into the device and an agitator keeps the fluorspar in suspension to help the dissolving process. The resulting solution is drawn off and fed into the water system.

A pilot model, large enough for fluoridating the water supply for a small community, was designed and installed in the filtration plant at Bel Air, Md., in July 1956 and has been running almost continuously since then. At this plant, water is pumped at a constant rate of 50 gallons per minute. The dissolver can fluoridate up to about 6,000,000 gallons of water per 100 pounds of 97 per cent fluorspar.

The dissolver described could be improved with further investigation. The pilot model is 2 feet in diameter, 4.5 feet high, with a 60 degree cone bottom. Its liquid capacity is about 75 gallons.

Division of Dental Public Health, U.S. Public Health Service, Bethesda, Md.

Several properties of saliva from Hunt-Hoppert caries-resistant and caries-susceptible rats

S. Rosen, M. A. Benerde, F. W. Fabian, H. R. Hunt and C. A. Hoppert. *J.D.Res.* 36:87-91 Feb. 1957

The evidence strongly supports the theory that lactobacilli are important factors in the etiology of tooth decay. Lactobacilli are recovered more frequently and in greater numbers from caries-susceptible than from caries-resistant rats.

It would seem that the saliva of susceptible and resistant rats might differ physically or chemically and thus account for the higher incidence or potency of cariogenic organisms in the susceptible rats.

The following eight properties of the saliva of the Hunt-Hoppert caries-resistant and caries-susceptible rats were studied: pH, amylase activity, relative viscosity, surface tension, refractive index, specific gravity, agglutinin titer for rat oral lactobacilli, and antagonistic effect of saliva against rat oral lactobacilli. The relative viscosity tended to be slightly, and possibly significantly, higher in saliva from caries-resistant rats. Of the other seven properties of saliva studied, no differences were found.

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▼ Public health dentistry

Dental health in New Zealand

Richard H. Roydhouse. *Pakistan D.Rev.* 6:132-138, 143 Oct. 1956

Up to 1905, a dentist in New Zealand was trained by being apprenticed for three years to a practicing dentist. In 1905 the University of Otago in Dunedin established a dental school. The school has continued to grow and recently contracted for a new five-story building of 88,000 square feet. Currently it graduates a class of from 40 to 50 dentists each year. It has a professional staff of 19 and provides a five year dental course. About 750 dentists in New Zealand serve a population of about 2,000,000. Most of them are in private practice. In addition, the country's four major centers have dental hospitals where fees are nominal or nonexistent; each dental hospital has a staff varying from two to six dentists.

Dentists are not the sole dental labor force. The state dental nurse was introduced as the result of a proposal suggested by the president of the New Zealand Dental Association in 1913. The first state dental nurse graduated in 1921. The Division of Dental Hygiene, a subdivision of the De-

partment of Health, was formed in 1919 to operate the dental service. The first training school for dental nurses was established in 1921 in Wellington; recently, similar schools have been opened in Auckland and Christchurch. Today there are 612 state dental nurses; 120 graduate from the training schools each year after a two year course; it is hoped to raise this to an annual class of 200 nurses.

The state dental nurses endeavor to treat all children between the ages of 3 and 12. In 1955 they treated 260,542 children. Treatment consists of restorations and extractions, and dental health education is stressed. State dental nurses usually are attached to schools, and are housed in separate small buildings with waiting room, operating room and change room. Fifty-eight dentists also work for the government; 30 of these are pedodontists and the remainder perform supervisory and administrative duties. A senior dental officer and a senior dental nurse visit each dental nurse every three months. The nurses succeed in maintaining the oral health of the nation's children. Although few 12 year old children have less than half a dozen restorations, few lose any permanent teeth by this age. The high proportion of intact dental arches in young adolescents is due almost entirely to the work of the state dental nurses.

Dental technicians are laboratory workers only. They are trained through a five year apprenticeship, after which they either work for private dentists or maintain their own establishments. Dental technicians are forbidden by law to operate on patients in any fashion whatsoever. Unfortunately, some do take impressions and make dentures illegally. Sporadic attempts to take legal action against this misconduct does little to remedy the situation. If oral procedures are unnecessary, the dental technician is permitted to repair broken prosthetic appliances without reference to a dentist.

The institution of dental nurses is supported by the taxpayers and treatment is free. If the dental nurse refers a patient to a dentist, in some circumstances the Health Department will pay the dentist.

In 1946 a government of socialist leanings introduced a program providing complete health services (including to some extent dentistry) available to all without fee. For example, any man with tuberculosis can be hospitalized and be paid the basic working wage while incapacitated. A plan was introduced to provide free dental treatment up to the age of 18. The treatment excluded dentures and extractions; because of insufficient manpower, this scheme was to be implemented slowly. Today, treatment is free under the Dental Benefits Scheme up to the sixteenth birthday.

The demand for dental treatment is being increased by free treatment for the children and adolescents, and by the increasing value placed on teeth. The number of dentists is increasing at a rate far below the demand, however. In this situation, either the standard of dentistry deteriorates, mouths become neglected, or more complete dentures are made.

Otago, New Zealand

▼ Nutrition

The relation of nutrition to the morphology and size of rat molar teeth

K.J. Paynter and R.M. Grainger. *J.Canad.D.A.* 22:519-531 Sept. 1956

The present studies were undertaken to examine the nature of changes which might be produced in the macroscopic morphology of teeth by the type of dietary variations which commonly exist among the population of civilized countries. Because vitamin A has such a specific effect on ameloblasts, the activity of which ultimately determines the exterior shape of the teeth, the series of experiments was begun by reducing the amount of vitamin A in the diet of pregnant rats and observing the effects on the teeth of the offspring. Subsequent work was done with water-borne fluoride and with calcium-phosphorus disbalance and their interactions. The results of all experiments are reported.

Analysis of measurements of the upper first molar teeth of weanling rats established that when these rats were born and nursed by mothers whose diet was either deficient in vitamin A or had an abnormally high phosphate content,

or contained 12 ppm fluoride, the teeth were smaller than those of controls.

The smaller size of teeth in the group deficient in vitamin A was related to the generally smaller size of these animals. This was not true of animals on either the high phosphate diet or on the diet supplemented with fluoride.

When female rats were maintained on the high phosphate diet for a period of ten weeks prior to mating, the teeth of the offspring of these rats were found to be smaller than any others, and in addition the depth of the mesial fissure was less, and the angulation of the sides of this fissure was greater, than in either of the other experimental or control groups.

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Dental health education

A chain reaction in dental health education

Jacqueline H. David. *J.California D.A. & Nevada D.Soc.* 32:455-457 Nov.-Dec. 1956

In November 1953 a dental health program was begun in the Everett Junior High School, San Francisco. Earlier, the author had held a meeting with the principal, the curriculum assistants, the public health nurse and members of the faculty health council. The group had agreed on the following objectives for a dental health instruction program: (1) to foster the best possible attitudes and habits in personal dental hygiene among Everett students; (2) to motivate students to assume responsibility for their own dental health; (3) to increase the dental health experience and scientific dental information for students; (4) to give senior student dental hygienists at the University of California School of Dentistry the opportunity of carrying to a logical conclusion an original four lesson unit in dental health, and (5) to enrich the teaching experience of the student hygienist by establishing a sustained relationship with the class and its teacher.

A plan was adopted which has become a part of the dental health education course requirement at the University of California, division of dental hygiene. Each student dental hygienist is responsible for (1) the preparation of a unit of instruction in dental health, to be completed in four 50-minute class periods, and (2) the teaching of this unit to two junior high school social studies or science classes. Thus, the plan gives the student dental hygienist the opportunity of conducting eight class periods.

At the end of the first year's teaching program, it was declared a success, and an invitation was extended to the division of dental hygiene to continue this activity the following year. In November 1954 added intramural activities were included as part of the project. The junior high school student health council helped to introduce the program to the entire school. A field trip visit to the School of Dentistry was arranged for junior high school students by the student dental hygienists. Student hygienists had an opportunity, before commencing their teaching, to visit the classrooms and become acquainted with the teachers to whom they were assigned. An appropriate dental health exhibit was placed in the school library. Two of the student hygienists addressed a meeting of the Parent-Teacher Association. Several other student hygienists worked with members of the junior high school student committees on publicity, a dental health questionnaire and a dental health skit.

At the conclusion of the program, an evaluation was made and the results distributed to interested educational and health agencies in San Francisco. This led to the inclusion of three other junior high schools in the plans for the fall of 1955. In the fall of 1956 other junior high schools were added.

University of California, San Francisco 22, Calif.

Doctoral and Masters' dissertations

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In this column each month are listed recent Doctoral and Masters' dissertations of dental interest, accepted by the dental schools or graduate schools in partial fulfillment for advanced degrees. Copies of many of these theses are available from the schools through interlibrary loan.

The effects of oral prostheses on the production of speech sounds. *Alexander L. Martone. 1956.* M.SC. *Ohio State University.*

An investigation of the degree of error in angular measurements of mandibular rest position using a roentgenographic cephalometric technique. *William Robert Schmidt. 1955.* M.SC. *Ohio State University.*

Roentgenographic cephalometric growth studies of normal and Class II dentitions of the Navajo Indians. *Louis J. Snyder. 1956.* M.SC. *Ohio State University.*

The comparison of different methods of recording centric relation. *Krishan K. Kapur. 1956.* M.S. *Tufts University.*

The tasks of the dental mobile unit "President Wilhelm Pieck," and the evaluation of the serial examinations made in regard to oral and dental conditions (Die Aufgaben des Ambulanzzuges "Staatspräsident Wilhelm Pieck" und eine Auswertung der durch ihn durchgeführten Reihenuntersuchungen: Unter besonderer Berücksichtigung der stomatologischen Verhältnisse). *Hildegard Letz-Schneider. 1954.* DR.MED. DENT. *University of Berlin, Germany.*

The properties of the drinking water in Berlin: its contents of chloride and fluoride and data on the effects of natural fluoride on human teeth (Über die Eigenschaften des Berliner Trinkwassers: Unter besonderer Berücksichtigung der Chlorierung und seines Fluorgehaltes sowie Angaben über eigene Untersuchungen über die Fluoreinwirkung am menschlichen Gebiss). *Fred Friedrich Maier. 1955.* DR.MED.DENT. *University of Berlin, Germany.*

Experimental examinations of the durability of color in different self-curing acrylic resins (Experimentelle Untersuchungen über die Farbbeständigkeit an schnellhärtenden Kunststoffen). *Ernst Wildhagen. 1954.* DR.MED.DENT. *University of Göttingen, Germany.*

Roentgenographic examinations for the definition of the so-called dislocations of the temporomandibular joint (Röntgenologische Untersuchungen zur Begriffsbestimmung der sogenannten Luxation im Kiefergelenk). *Hans Hunold. 1954.* DR. MED.DENT. *University of Halle/Saale, Germany.*

Critical observation of the form of masticatory surfaces of artificial teeth from a physiological standpoint (Kritische Betrachtungen über die Kauflächengestaltung künstlicher Zähne nach physiologischen Gesichtspunkten). *M. H. Graser. 1954.* DR.MED.DENT. *University of Frankfurt/Main, Germany.*

The determination of the properties of the so-called self-curing acrylic resins "Palavit F," "Hesacryl" and "Doppelstern Orthofil" (Ein Beitrag zu neueren Untersuchungsmethoden der sogenannten selbstpolymersierenden Kunststoffe "Palavit F," "Hesacryl" und "Doppelstern Orthofil"). *Wilhelm Lopau. 1954.* DR.MED.DENT. *University of Hamburg, Germany.*

Iontophoresis used in the treatment of periapical inflammation (Die Einwirkung der Ionophorese auf die Entzündungsvorgänge im periapikalen Gewebe). *Ekkehard Fischer. 1954.* DR.MED. DENT. *University of Heidelberg, Germany.*

Disturbances in the development of the mandible after osteomyelitis (Wachstumsstörungen nach Osteomyelitis des Unterkiefers im jugendlichen Alter). *Rudolf Wilhelm Kühn. 1954.* DR.MED. DENT. *University of Heidelberg, Germany.*

Vaccine and paravaccinia of the oral mucous membrane (Vaccine der Mundschleimhaut, einschliesslich der Paravaccine). *Edgar Arnold. 1954.* DR.MED.DENT. *University of Jena, Germany.*

The individual formation of the mandibular flanges in complete lower dentures according to Strack (Zur Frage der individuellen Gestaltung der Unterkieferzungenflügel an totalen Unterkieferprothesen nach Strack). *Helmuth Seifert. 1954.* DR.MED.DENT. *University of Jena, Germany.*

Relation between dental focal infection and ocular disease (Erfahrungen über dentogene Herdinfektionen und Herdsanierungen bei Augenleiden). *Jutta Linnbach. 1954.* DR.MED.DENT. *University of Leipzig, Germany.*

The influence of environment on caries development in preschool children (Der Einfluss des häuslichen Milieus auf die Karies bei vorschulpflichtigen Kindern). *Rolf Lorenz. 1954.* DR.MED.DENT. *University of Leipzig, Germany.*

Proximal caries and cleaning of the teeth (Approximalkaries und Gebissreinigung). *Hans Heinrich Hartmann. 1954.* DR.MED.DENT. *University of Mainz, Germany.*

Experiments with resharpened burs (Untersuchungen über aufgeschärfte zahnärztliche Bohrer). *Peter Herrmann. 1954.* DR.MED.DENT. *University of Mainz, Germany.*

Life and work of Professor Fritz Willinger: a contribution to the history of dentistry (Leben und Werk des Zahnarztes Professor Dr. Fritz Willinger: Ein Beitrag zur Geschichte der Zahnheilkunde). *Marianne Girke-Kurz. 1954.* DR.MED.DENT. *University of Munich, Germany.*

Topical treatment of facial burns (Über lokale Behandlungsarten und Verbrennungen). *Hans Georg Haas. 1954.* DR.MED.DENT. *University of Munich, Germany.*

Does the topical application of sodium fluoride prevent caries? (Hat die lokale Applikation von Natriumfluorid einen karieshemmenden Einfluss?). *Eduard Hofius. 1954.* DR.MED.DENT. *University of Münster, Germany.*

Submandibular sialoadenitis and sialodoch'tis in salivary calculi disease (Podtsheljustnye sialodenity i sialodochity pri sljunnokamennoj bolezni). *H. D. Lesovaja. 1955.* CAND. MED. SC. *University of Kharkow, U.S.S.R.*

Denture effects on the mucous membrane of the oral cavity (Vlijanie plastintshatych protezov na slizistuju obolotshku polosti rta). *Z. S. Vasilenko. 1955.* CAND. MED. SC. *University of Kiev, U.S.S.R.*

The outcome and principles of orthopedic treatment of severe gunshot maxillodental injuries (Posledstvija tjazholych povrezhdenij zubo-tsheljustnoj sistemy ognestrelnogo proischozhdenija i printsipi ortopeditsheskogo letshenija). *A. A. Kuznetsova. 1955.* CAND. MED. SC. *University of Moscow, U.S.S.R.*

The history of development of stomatology in Armenia (K voprosu ob razvitija stomatologiji v Armeniji). *Ch. A. Badaljan. 1955.* CAND. MED. SC. *University of Erevan, U.S.S.R.*

The activity of alkaline phosphatases of blood plasma in pathological processes of face and jaws (Aktivnostj stshelotshnoj fosfatazy plazmy krovi pri patologitsheskich protsessach tsheljustnolitsevoj oblastji). *M. B. Beltshikova. 1955.* CAND. MED. SC. *University of Riga, U.S.S.R.*

The significance of protein and vitamin B_1 metabolism in some infections and its connection with the causation of dental caries (Osobennostji obmena belkov i vitamina B_1 pri nekotorych infektsijach i svjaz ich s vozniknovenijem kariesa zubov). *B. M. Bobileva. 1955.* CAND. MED. SC. *University of Moscow, U.S.S.R.*

Morphology of maxillary sinuses (Morfologija verchnetsheljustnych pazuch). *J. A. Klimovets. 1955.* CAND. MED. SC. *University of Alma-Ata, U.S.S.R.*

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